Vol. 1083 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

October 6, 1987

U.S.
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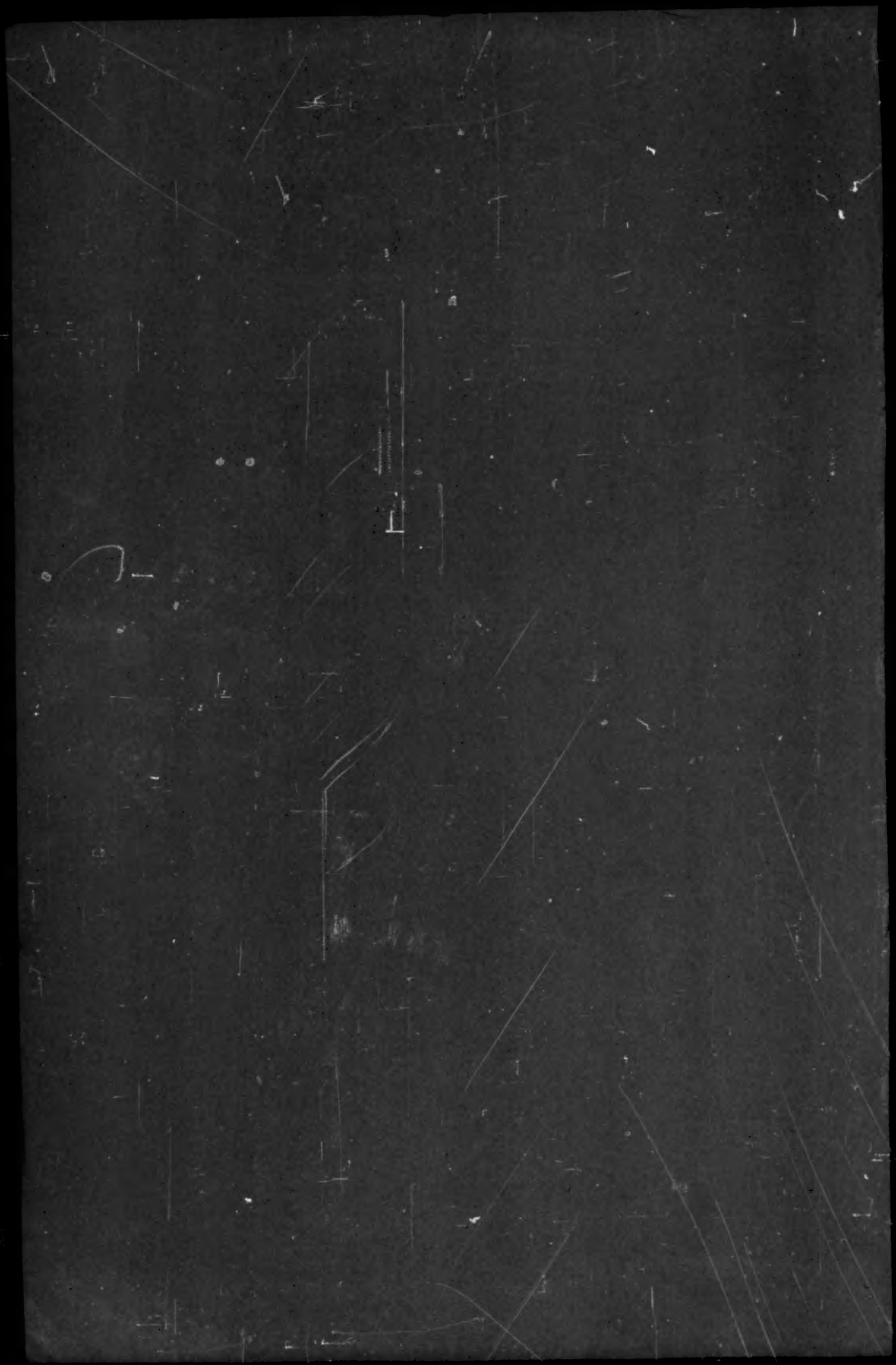

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on October 2, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,473,907 through 4,475,246
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 19, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,393,520	06/345,026	7/19/83
4,393,526	06/323,928	7/19/83
4,393,527	06/418,536	7/19/83
4,393,528	06/259,414	7/19/83
4,393,533	06/289,782	7/19/83
4,393,543	06/272,901	7/19/83
4,393,546	06/303,401	7/19/83
4,393,549	06/306,857	7/19/83
4,393,552	06/222,531	7/19/83
4,393,569	06/277,877	7/19/83
4,393,576	06/298,927	7/19/83
4,393,579	06/235,802	7/19/83
4,393,593	06/305,926	7/19/83
4,393,595	06/284,966	7/19/83
4,393,601	06/314,865	7/19/83
4,393,604	06/311,485	7/19/83
4,393,605	06/264,803	7/19/83
4,393,606	06/296,450	7/19/83
4,393,608	06/299,170	7/19/83
4,393,609	06/328,571	7/19/83
4,393,614	06/238,763	7/19/83
4,393,615	06/325,726	7/19/83
4,393,618	06/265,204	7/19/83
4,393,619	06/278,733	7/19/83
4,393,630	06/243,049	7/19/83
4,393,632	06/228,336	7/19/83
4,393,648	06/300,598	7/19/83
4,393,664	06/324,482	7/19/83
4,393,668	06/294,679	7/19/83
4,393,671	06/225,437	7/19/83
4,393,685	06/237,409	7/19/83
4,393,691	06/301,365	7/19/83
4,393,694	06/264,647	7/19/83
4,393,699	06/272,231	7/19/83
4,393,704	06/259,836	7/19/83
4,393,705	06/287,246	7/19/83
4,393,706	06/303,672	7/19/83
4,393,708	06/314,929	7/19/83
4,393,713	06/241,743	7/19/83
4,393,714	06/323,692	7/19/83
4,393,722	06/273,741	7/19/83
4,393,726	06/304,735	7/19/83
4,393,739	06/247,237	7/19/83
4,393,740	06/221,983	7/19/83
4,393,745	06/288,624	7/19/83
4,393,746	06/288,826	7/19/83
4,393,757	06/314,955	7/19/83
4,393,762	06/369,814	7/19/83
4,393,765	06/286,853	7/19/83
4,393,767	06/297,196	7/19/83
4,393,777	06/225,499	7/19/83
4,393,780	06/293,739	7/19/83
4,393,783	06/317,049	7/19/83
4,393,793	06/344,376	7/19/83
4,393,804	06/320,545	7/19/83
4,393,812	06/267,089	7/19/83
4,393,813	06/278,854	7/19/83
4,393,814	06/252,254	7/19/83
4,393,844	06/439,815	7/19/83
4,393,854	06/235,519	7/19/83
4,393,856	06/240,535	7/19/83
4,393,857	06/246,915	7/19/83
4,393,871	06/249,228	7/19/83
4,393,885	06/303,736	7/19/83
4,393,926	06/251,354	7/19/83
4,393,928	06/296,640	7/19/83
4,393,930	06/244,997	7/19/83
4,393,954	06/255,156	7/19/83
4,393,957	06/228,976	7/19/83
4,393,963	06/412,745	7/19/83
4,393,968	06/217,808	7/19/83
4,393,970	06/288,897	7/19/83
4,393,974	06/284,081	7/19/83
4,393,976	06/356,962	7/19/83
4,393,992	06/258,311	7/19/83
4,393,993	06/267,666	7/19/83
4,393,999	06/220,798	7/19/83
4,394,003	06/321,591	7/19/83
4,394,004	06/266,488	7/19/83
4,394,010	06/286,338	7/19/83
4,394,012	06/275,914	7/19/83
4,394,014	06/257,992	7/19/83
4,394,015	06/337,150	7/19/83
4,394,017	06/270,894	7/19/83
4,394,029	06/250,762	7/19/83
4,394,038	06/223,854	7/19/83
4,394,040	06/286,610	7/19/83

Patent Number	Serial Number	Issue Date
4,394,041	06/263,605	7/19/83
4,394,042	06/369,560	7/19/83
4,394,051	06/270,038	7/19/83
4,394,052	06/283,997	7/19/83
4,394,076	06/282,279	7/19/83
4,394,084	06/281,305	7/19/83
4,394,099	06/227,225	7/19/83
4,394,106	06/295,829	7/19/83
4,394,124	06/265,040	7/19/83
4,394,139	06/354,825	7/19/83
4,394,141	06/263,357	7/19/83
4,394,144	06/299,263	7/19/83
4,394,145	06/285,474	7/19/83
4,394,148	06/314,607	7/19/83
4,394,155	06/231,813	7/19/83
4,394,173	06/258,274	7/19/83
4,394,197	06/265,133	7/19/83
4,394,200	06/240,814	7/19/83
4,394,201	06/334,595	7/19/83
4,394,208	06/290,714	7/19/83
4,394,218	06/338,275	7/19/83
4,394,223	06/308,973	7/19/83
4,394,224	06/256,251	7/19/83
4,394,232	06/347,973	7/19/83
4,394,255	06/395,940	7/19/83
4,394,259	06/315,368	7/19/83
4,394,260	06/311,873	7/19/83
4,394,264	06/302,759	7/19/83
4,394,269	06/262,831	7/19/83
4,394,280	06/369,364	7/19/83
4,394,306	06/256,476	7/19/83
4,394,308	06/305,693	7/19/83
4,394,309	06/249,247	7/19/83
4,394,358	06/303,100	7/19/83
4,394,359	06/303,425	7/19/83
4,394,360	06/325,811	7/19/83
4,394,363	06/258,880	7/19/83
4,394,366	06/260,059	7/19/83
4,394,368	06/327,539	7/19/83
4,394,375	06/271,008	7/19/83
4,394,377	06/289,001	7/19/83
4,394,386	06/338,474	7/19/83
4,394,393	06/324,380	7/19/83
4,394,410	06/290,603	7/19/83
4,394,424	06/292,087	7/19/83
4,394,432	06/268,329	7/19/83
4,394,438	06/291,703	7/19/83
4,394,439	06/267,685	7/19/83
4,394,445	06/331,449	7/19/83
4,394,473	06/309,046	7/19/83
4,394,501	06/231,271	7/19/83
4,394,521	06/258,522	7/19/83
4,394,532	06/249,393	7/19/83
4,394,535	06/241,926	7/19/83
4,394,560	06/310,283	7/19/83
4,394,561	06/251,360	7/19/83
4,394,562	06/272,565	7/19/83
4,394,563	06/271,513	7/19/83
4,394,568	06/294,054	7/19/83
4,394,604	06/263,740	7/19/83
4,394,609	06/250,703	7/19/83
4,394,617	06/298,657	7/19/83
4,394,654	06/255,192	7/19/83
4,394,661	06/247,405	7/19/83
4,394,686	06/247,774	7/19/83
4,394,698	06/245,381	7/19/83
4,394,705	06/336,711	7/19/83
4,394,714	06/241,046	7/19/83
4,394,740	06/244,268	7/19/83
4,394,760	06/238,071	7/19/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,535,732, Re. S.N. 087,629, Filed Aug. 20, 1987, Cl. 123/90.16, VALVE OPERATION CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES, Yoshikatsu Nakano, Owner of Record: *Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: Robert D. Lyon, et al., Ex. Gp.: 346

4,536,386, Re. S.N. 087,434, Filed Aug. 20, 1987, Cl. 424/10, METHOD AND PHARMACEUTICAL PREPARATION FOR CONTROLLING EMESIS CAUSED BY CISPLATIN AND OTHER EMETOGENIC AGENTS IN CANCER CHEMOTHERAPY, Robert E. Keenan, Owner of Record: *A. H. Robins Co., Richmond, Va.,* Attorney or Agent: Jerome G. Lee, et al., Ex. Gp.: 123

4,536,911, Re. S.N. 088,100, Filed Aug. 13, 1987, Cl. 15/230.12, FLOOR CLEANING PAD, Peter G. Demetriades, Owner of Record: *Inventor,* Attorney or Agent: Peter N. Lalos, et al., Ex. Gp.: 242

4,538,732, Re. S.N. 087,262, Filed Aug. 20, 1987, Cl. 206/613, CARTON WITH IMPROVED OPENING STRUCTURE, Morris W. Kuchenbecker, Owner of Record: *James River-Norwalk, Inc., Norwalk, Conn.,* Attorney or Agent: William A. Aguele, Ex. Gp.: 241

4,538,829, Re. S.N. 089,667, Filed Aug. 25, 1987, Cl. 280/641, CANOE CADDY, Justin Horowitz, Owner of Record: *Inventor,* Attorney or Agent: James R. Frederick, et al., Ex. Gp.: 316

4,538,847, Re. S.N. 089,330, Filed Aug. 25, 1987, Cl. 294/53.5, PIVOTABLE MULTIPLE SOCKET, John P. Lapshansky, Owner of Record: *Inventor,* Attorney or Agent: James C. Wood, et al., Ex. Gp.: 312

4,609,894, Re. S.N. 089,440, Filed Aug. 26, 1987, Cl. 334/011, TUNING DEVICE, Toshiaki Oguchi, Owner of Record: *Citizen Watch Co., Ltd., Tokyo, Japan,* Attorney or Agent: Terrell C. Birch, et al., Ex. Gp.: 252

4,619,058, Re. S.N. 090,042, Filed Aug. 26, 1987, Cl. 36/102, FOOTWEAR CORRESPONDING TO PHYSIOLOGY, Jerry F. Gumbert, Owner of Record: *Inventor,* Attorney or Agent: Herbert C. Brinkman, et al., Ex. Gp.: 247

4,662,788, Re. S.N. 086,755, Filed Aug. 17, 1987, Cl. 405/204, OFFSHORE PLATFORM LEG-MATING APPARATUS AND A METHOD OF ASSEMBLY, Dean A. Kypke, et al., Owner of Record: *Conoco, Inc., Ponca City, Okla.,* Attorney or Agent: A. Joe Reinert, et al., Ex. Gp.: 351

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

Re. 30,333, Reexam. No. 90/001,318, Requested: Aug. 28, 1987, Cl. 60/605, EBULLIENT COOLED TURBO CHARGER BEARING HOUSING, Phillip B. Gordon, et al., Owner of Record: *Caterpillar, Inc., Peoria, Ill.,* Attorney or Agent: W. A. Van Santen, Ex. Gp.: 340, Requester: Owner

3,333,198, Reexam. No. 90/001,281, Requested: July 6, 1987, Cl. 455/6, TELEVISION CONVERTER FOR CATZ SYSTEM, Ronald C. Mandell, Owner of Record: *International Telemeter Corp., Los Angeles, Calif.,* Attorney or Agent: Unknown, Ex. Gp.: 260, Requester: Zenith Electronic Corp., Glenview, Ill.

3,814,096, Reexam. No. 90/001,315, Requested: Aug. 27, 1987, Cl. 604/289, FACIAL TISSUE, Felica R. & Harry M. Weiss, Owner of Record: *Inventors, Scottsdale, Ariz.,* Attorney or Agent: Unknown, Ex. Gp.: 330, Requester: Kimberly-Clark Corp., Neenah, Wis.

3,959,696, Reexam. No. 90/001,316, Requested: Aug. 26, 1987, Cl. 361/120, OVER VOLTAGE ARRESTER, Gerhard Lange, et al., Owner of Record: *Siemens Aktiengesellschaft, Berlin, Germany,* Attorney or Agent: Hill, Van Santen, et al., Ex. Gp.: 210, Requester: Reliance Comm/Tec Corp., Cleveland, Ohio

3,975,354, Reexam. No. 90/001,312, Requested: Aug. 21, 1987, Cl. 524/409, GLASS FIBER-REINFORCED FLAME RESISTANT THERMOPLASTIC POLYESTER MOULDING COMPOSITIONS CONTAINING POLY-(2,4,6-TRIBROMOSTYRENE), Lothar Buxbaum, et al., Owner of Record: *Ciba-Geigy Corp., Ardsley, N.Y.,* Attorney or Agent: Karl F. Jorda, Ex. Gp.: 150, Requester: Great Lakes Chemical Corp., W. Lafayette, Ind.

4,134,402, Reexam. No. 90/001,319, Requested: Aug. 31, 1987, Cl. 128/214, DOUBLE LUMEN HEMODIALYSIS CATHETER, Dr. Sakharam D. Mahurkar, Owner of Record: *Inventor, Chicago, Ill.,* Attorney or Agent: Unknown, Ex. Gp.: 330, Requester: Cushman, Darby, et al., Washington, D.C.

4,140,889, Reexam. No. 90/001,317, Requested: Aug. 28, 1987, Cl. 219/10.55, COOKING VESSEL FOR MICROWAVE OVEN COOKERY ADAPTED TO AID IN BROWNING FOODS BY HEAT FROM HOT LIQUID FATS, Stanley I. & Charlotte G. Mason, Owner of Record: *Inventors, Weston, Conn.,* Attorney or Agent: Haynes N. Johnson, Ex. Gp.: 210, Requester: Owner

4,335,852, Reexam. No. 90/001,310, Requested: Aug. 21, 1987, Cl. 239/68, DEVICE FOR CONTROLLING THE FLOW OF FLUID, Ho Chow, Owner of Record: *Jet Stream, Inc., Wilmington, Del.,* Attorney or Agent: James & Franklin, Ex. Gp.: 310, Requester: Owner

4,351,897, Reexam. No. 90/001,313, Requested: Aug. 24, 1987, Cl. 430/555, COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL, Kozo Aoki, Owner of Record: *Fuji Photo Film Co., Ltd., Kanagawa, Japan,* Attorney or Agent: Waddell A. Biggart, Ex. Gp.: 150, Requester: Owner

4,470,930, Reexam. No. 90/001,311, Requested: Aug. 24, 1987, Cl. 260/405, PREPARATION OF NUCLEAR CHLORINATED AROMATIC COMPOUNDS, David Y. Tang, et al., Owner of Record: *Occidental Chemical Corp., Niagara Falls, N.Y.,* Attorney or Agent: James F. Tao, Ex. Gp.: 120, Requester: Curtis, Morris, et al, New York, N.Y.

4,492,762, Reexam. No. 90/001,314, Requested: Aug. 25, 1987, Cl. 436/537, FLUORESCENT POLARIZATION IMMUNOASSAY, C. J. Wang, et al., Owner of Record: *Abbott Laboratories, Abbott Park, Ill.,* Attorney or Agent: K. V. Rockey, Ex. Gp.: 130, Requester: Jackson & Jones, Tustin, Calif.

4,639,301, Reexam. No. 90/001,320, Requested: Aug. 31, 1987, Cl. 204/192.310, FOCUSED ION BEAM PROCESSING, John A. Doherty, et al., Owner of Record: *Micrion Limited Partnership, Beverly, Mass.,* Attorney or Agent: Charles Hieken, Ex. Gp.: 110, Requester: Seiko Denshi Kogyo Kabushiki Kaisha, Tokyo, Japan

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Request for Certification of Deposits Made Under the Budapest Treaty

Deposits of microorganisms made in International Depositary Authorities are subject to the regulations of the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure. Rule 11.3(a) of the Treaty regulations establishes a procedure by which an industrial property office shall assure the depositary that release of a sample is proper. Pursuant to the Treaty, the United States Patent and Trademark Office receives requests for certification that release of a sample of a deposited microorganism is proper under United States law. Effective immediately, all such requests for certification shall be directed to the Director, Patent Examining Group 120, United States Patent and Trademark Office, who has been delegated the authority to act on requests for certification under Rule 11.3(a) of the Budapest Treaty regulations.

DONALD J. QUIGG,
Sept. 4, 1987. *Assistant Secretary and Commissioner of Patents and Trademarks.*

Patent and Trademark Office Board of Patent Appeals and Interferences Vacancies

The Board of Patent Appeals and Interferences will be filling a number of Examiner-in-Chief vacancies over the next several months. Positions are available in chemical, electrical, and mechanical technologies. Persons interested in being considered for these vacancies are invited to submit individual applications for each of the following vacancy announcements:

PTO–87–A6–chemical technology, PTO–87–A7–electrical technology, and PTO–87–A8–mechanical technology. There is no deadline for submitting applications. However, candidates are urged to apply as soon as possible since applications will be accepted only until the positions are filled.

Excerpts from the vacancy announcements describing the duties of the position, qualification requirements, factors to be used in evaluating candidates, and necessary application materials are listed below.

Duties: Serves as a member of the Board of Patent Appeals and Interferences of the Patent and Trademark Office. As an Examiner-in-Chief, participates in the Board's appellate and administrative responsibilities and exercises independent judgment on all matters before him/her on appeal, subject to administrative and policy direction of the Commissioner, and may be responsible for conducting interlocutory proceedings in interference and for determining questions of priority of invention and patentability between interference parties. Appeals filed in accordance with 35 USC 134 and interferences declared in accordance with 35 USC 135 involve complex legal and technical questions. The Board of Patent Appeals and Interferences has the sole power to:

(1) hear and adjudicate appeals from decisions of the Primary Examiners as to patentability in applications for patents, for reissue of patents, and for reexamination of patents;
(2) to declare and to conduct proceedings in interferences; and
(3) to determine priority of invention.

Final decisions of the Board, if unfavorable to an applicant, or to a party to an interference, may be appealed to the United States Court of Appeals for the Federal Circuit or civil action may be taken in accordance with 35 USC 145, or 35 USC 146.

Qualification requirements: In addition to a technical degree, candidates must possess:

(1) A minimum of five years of comprehensive patent experience of which at least two years involved the exercise of independent judgment in a responsible position as typified by the exercise of Full Signatory Authority as a Patent Examiner or by comparable experience in some other position inside or outside the Patent and Trademark Office;
(2) A law degree and membership in good standing of the bar in any state, D.C., Puerto Rico, or any territorial court under the Constitution;
(3) A high degree of demonstrated competence in chemical, electrical, or mechanical technology;
(4) A high degree of demonstrated competence and knowledge of interference law and practice;
(5) Demonstrated ability to determine whether or not tests which are submitted in evidence are technically sufficient to prove the question at hand;
(6) Demonstrated ability to write clearly, and to write logically developed opinions;
(7) Demonstrated ability to use legal and technical background to evaluate testimony of witnesses;
(8) Demonstrated ability to deal effectively with people within and outside the Patent and Trademark Office; and
(9) Comprehensive experience in patent prosecution, examination, or administration which demonstrates a thorough knowledge and application of patent laws and rules of practice.

Factors which will be considered in evaluating qualified candidates: Candidates will be evaluated on the total range of their education, training and experience as well as supervisory appraisals and questionnaire responses.

Interested candidates should submit the following:

(1) Personal Qualifications Statement, SF–171;
(2) Merit Program Interest Statement, CD–261 (PTO employees only);
(3) Current supervisory appraisal on your agency's form or on CD–362 (letters of reference for outside candidates);
(4) Annual narrative performance rating, or equivalent;
(5) Examiner-in-Chief Questionnaires; and
(6) Samples which evidence your writing ability.

Questions concerning this notice and requests for application materials should be directed to Ms. Suzanne Waddill, Office of Personnel, One Crystal Park, Suite 700, Arlington, Va., telephone (703) 557–3631.

DONALD W. PETERSON,
Deputy Assistant Secretary and Deputy Commissioner or Patents and Trademarks.

Feb. 3, 1987.

PATENT NOTICES

Certificates of Correction for the Week of Oct. 6, 1987

D. 279,863	4,632,570	4,652,346	4,664,879
D. 289,028	4,633,843	4,652,588	4,665,672
D. 289,276	4,635,504	4,652,798	4,665,736
D. 290,788	4,636,097	4,653,201	4,667,214
4,366,456	4,636,817	4,653,241	4,667,227
4,476,902	4,636,967	4,654,556	4,667,433
4,505,026	4,639,084	4,655,034	4,667,990
4,509,767	4,640,153	4,655,244	4,668,196
4,529,723	4,640,237	4,655,599	4,668,338
4,566,876	4,640,609	4,655,811	4,668,744
4,567,540	4,640,921	4,656,172	4,668,747
4,576,747	4,641,649	4,656,804	4,668,994
4,589,288	4,642,964	4,656,962	4,669,376
4,591,795	4,643,787	4,657,102	4,669,597
4,593,064	4,643,869	4,658,519	4,670,032
4,595,740	4,644,860	4,658,770	4,670,353
4,597,494	4,645,007	4,659,920	4,670,556
4,599,308	4,645,161	4,659,951	4,671,409
4,613,211	4,645,766	4,660,037	4,671,740
4,613,704	4,646,086	4,660,161	4,672,460
4,616,837	4,646,481	4,660,519	4,672,461
4,620,661	4,647,316	4,660,844	4,672,564
4,621,577	4,648,169	4,661,327	4,672,768
4,623,633	4,650,053	4,661,393	4,672,984
4,626,303	4,650,708	4,661,811	4,673,291
4,626,828	4,651,506	4,662,360	4,673,427
4,628,450	4,651,524	4,662,563	4,673,655
4,628,507	4,651,760	4,662,586	4,674,060
4,631,245	4,651,976	4,662,777	4,679,785
4,631,249	4,652,239	4,663,669	4,679,882

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4222
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF August 29, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-13-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	10-1-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-22-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	9-17-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-14-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-25-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	5-28-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during August 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,522,401 to 3,526,003, inclusive

Plant Patents ..... Numbers 2,986 to 2,988 inclusive

STATUTORY INVENTION REGISTRATIONS

PUBLISHED OCTOBER 6, 1987

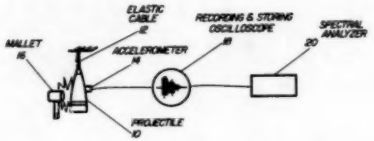
A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H336

NON-DESTRUCTIVE METHOD TO ASSESS PHYSICAL CONDITION OF CHEMICAL FILL

Miles C. Miller, Joppatowne, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 4, 1986, Ser. No. 937,802
Int. Cl.[4] G01N *9/04, 11/16*
U.S. Cl. 73—579 **3 Claims**



1. A method for noninvasively assessing the condition of liquid fill within a sealed projectile by measuring the frequency and damping characteristics of the said fill through its natural vibrational response conditions upon excitation, comprising the steps of:

suspending said projectile from an elastic cable means;

striking said projectile with an object to cause vibration;

measuring the vibrational pattern of said projectile, which vibration includes a composite of both fill vibration and projectile vibrations at their respective natural frequencies; and

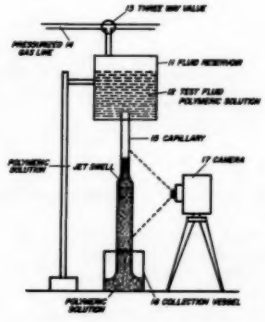
analyzing said responses to determine a change in fill vibrational response against known standards, to determine present condition of said fill thereby.

H337

DELAYED SWELL VISCOMETER

Joseph E. Matta, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 22, 1986, Ser. No. 944,122
Int. Cl.[4] G01N *11/08*
U.S. Cl. 73—55 **8 Claims**



1. A method of determining the Reynolds number (Re) of a viscous fluid comprising:

forcing a viscous fluid to flow through a capillary by pressure thereby forming a delayed die swell,

said capillary of a known inner diameter (D),

measuring the dimensional distance (X) between the capillary and the maximum initial width of said delayed die swell,

whereby the Reynolds number is ascertained according to the formula:

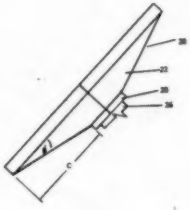
$$X/D=0.028\ (Re)^{1.24}.$$

H338

RESONANT FREE PLATEN FOR VIBRATION TESTING OF TEST SPECIMENS

Louie J. Lipp, Fallston, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 23, 1986, Ser. No. 944,123
Int. Cl.[4] G01M *7/00*
U.S. Cl. 73—663 **6 Claims**



1. A resonant free platen system for vibration testing of test specimens, comprising: a cylindrical shaker head, an inverted truncated pyramid platen having an area for receiving specimens to be tested and coupled to said cylindrical shaker head, and means for vibrating said shaker head.

H339

SNAP SLIT DOOR WITH OVER PRESSURE RELIEF

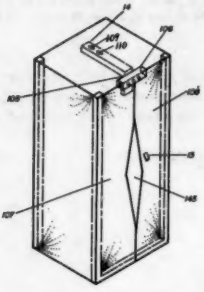
Robert D. Anderson, Orlando; John Carta, Maitland, and John D. Estes, Deland, all of Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 11, 1986, Ser. No. 908,137
Int. Cl.[4] A47H *23/00*
U.S. Cl. 160—327 **7 Claims**

1. A snap slit door comprising:

at least one panel having an edge;

a rigid member attached to each panel opposite the edge; and



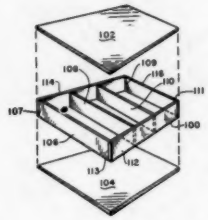
a flat closure means attached to at least one panel adjacent the edge.

H340

LOW MASS DIFFUSION BONDING TOOLS

Wallace R. MacKenzie, Quartz Hill, and Donald M. Fraser, Los Angeles, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 24, 1986, Ser. No. 832,114
Int. Cl.[4] B23K *37/00*
U.S. Cl. 228—44.3 **14 Claims**



1. Apparatus for performing diffusion bond integration of positioned individual component elements into a one-piece integral structure comprising:

multiple faced, hollow centered, low mass metal tooling means intimately surroundable by a plurality of said individual component elements, one on each tooling means face save at least one face, for retaining said individual component elements in fixed predetermined positional relationship during an element integrating diffusion bond sequence, the metal material of said tooling means having a plastic flow temperature range above that of said component elements, with said tooling means including internal metallic elongated thin structural members joining the interior surfaces of three of said multiple faces;

closable retort means for receiving and holding said component elements and said tooling means fixed in an assembled predetermined relationship during a diffusion bond sequence;

gaseous atmosphere control means connected with said retort means for displacing air therefrom during a closed retort diffusion bond sequence;

heating means for raising the temperature of said positioned component elements in said retort means to a predetermined temperature within the plastic flow range of said component element material; and

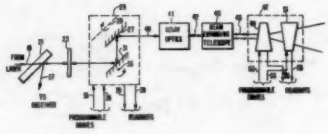
force generating means for urging said individual component elements into pressured intimate contact with adjacent component elements and with said tooling means during said diffusion bond sequence.

H341

DUAL MODE SCANNER/TRACKER

Robert J. Mongeon, S. Windsor, Conn., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 9, 1984, Ser. No. 669,912
Int. Cl.[4] G01C *3/08;* **G01B** *11/26;* **G01C** *1/00*
U.S. Cl. 356—152 **7 Claims**



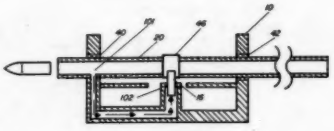
1. A dual mode scanner/tracker system for an optical radar, said radar comprising a laser beam having magnified and demagnified portions, a first programmable scanner/tracker located in said demagnified portion of said laser beam, said first scanner/tracker being high speed, high resolution and having a narrow field, a second programmable scanner/tracker located in the magnified portion of said laser beam, said second scanner/tracker being low speed, low resolution and having a wide scan angle, said two scanner/trackers being each driven by programmable drives which complement each other to produce efficient scanning of said laser beam and efficient tracking of randomly moving targets in the field of view of said optical radar.

H342

APPARATUS TO IMPROVE ACCURACY OF WEAPONS THROUGH BARREL FLEXURE

Eugene Geeter, Orange, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 870,214, May 29, 1986, Pat. No. H202. This application Jan. 12, 1987, Ser. No. 2,476
Int. Cl.[4] F41F *17/00, 21/00*
U.S. Cl. 89—14.05 **9 Claims**



1. A gun barrel adapter for a barrel having a longitudinal axis comprising:

a first bearing for engaging the barrel and for acting as a first fulcrum for flexing the barrel;

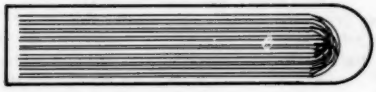
a second bearing for engaging the barrel at a location spaced along the longitudinal axis from the first bearing and for acting as a second fulcrum for flexing the barrel; and

actuator means operatively connected to said first and second bearings and engaged to the barrel between said first and second bearings for applying a lateral force to the barrel for flexing the barrel whereby a position of a muzzle of the barrel can be changed.

H343
FIBER ARRAY REINFORCED KINETIC ENERGY PENETRATOR AND METHOD OF MAKING SAME

William P. Keown, West Milford, and Donald T. Rorabaugh, Budd Lake, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 2, 1987, Ser. No. 24,093
Int. Cl.[4] F42B 11/14
U.S. Cl. 102—517 15 Claims

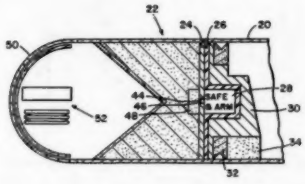


1. An improved penetrator rod for a kinetic energy projectile comprising a long metallic rod having an imbedded core of long fibers, said fibers woven together at the front end of said penetrator rod.

H344
HIGH VELOCITY CANTING SHAPED CHARGE WARHEAD

Joel E. Williamsen, and Michael C. Schexnayder, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 16, 1987, Ser. No. 26,089
Int. Cl.[4] F42B 11/22
U.S. Cl. 102—476 7 Claims



1. A missile having a shaped charge warhead mounted in a front portion thereof, said shaped charge warhead being mounted in a position in which the longitudinal axis through the warhead is substantially parallel to the longitudinal axis of the missile, explosive means mounted for canting the warhead to a canted position relative to the longitudinal axis of the missile, means for separating said front portion from said missile to allow said warhead to be canted to the canted position, and means for setting off said warhead in said canted position.

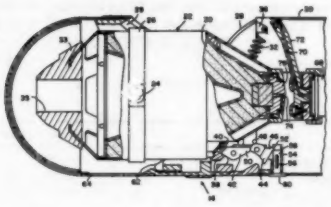
6. A missile having a shaped charge warhead mounted in a front portion thereof, and means for canting said shaped charge warhead toward a target as the missile arrives at the target.

H345
MISSILE CANTING SHAPED CHARGE WARHEAD

Joel E. Williamsen; Donald E. Lovelace, and Michael C. Schexnayder, all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 30, 1987, Ser. No. 31,979
Int. Cl.[4] F42B 11/22
U.S. Cl. 102—476 4 Claims

1. A missile having a shaped charge warhead pivotally mounted in a front portion thereof, said shaped charge warhead having releasable latch mechanism holding said shaped charge warhead in a position in which the longitudinal axis through the warhead is substantially parallel to the longitudinal axis of the missile, biasing means biasing the pivoted warhead to a position which is canted relative to the longitudinal axis of the missile, said releasable latch mechanism being such



as to be released upon launching of the missile from a launch tube to allow said warhead to be canted to the canted position, and latch means for latching the warhead in said canted position.

H346
PROCESS FOR MAKING COMPOUNDS POSSESSING ANTICHOLINESTERASE ACTIVITY

Joseph Epstein, Baltimore; Harry O. Michel, Towson; Robert E. Plapinger, Baltimore; Joseph H. Fleisher, Baltimore; John J. Callahan, Baltimore, and Bernard J. Jandorf, Baltimore, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 5, 1969, Ser. No. 798,268
Int. Cl.[4] C07F 9/02
U.S. Cl. 558—105 7 Claims

1. The method of preparing a S-(2-dialkylaminoethyl)alkyl phosphonothioic acid compound possessing anticholinesterase activity comprising contacting a dialkylaminoethyl chloride with an aqueous medium forming a dialkylmonoethyl ammonium ion, reacting the latter ion with an alkylphosphonothioic acid, thereby forming a reaction mixture in the aqueous medium, adjusting the pH of the aqueous medium containing the reaction mixture to pH 5 to 7 to form S-(2-dialkylaminoethyl) alkyl phosphonothioic acid in solution, placing the solution containing the S-(2-dialkylaminoethyl) alkyl phosphonothioic acid upon a cation ion-exchange resin in hydrogen form, adding an eluting agent to the ion-exchange resin and collecting the compound possessing anticholinesterase activity.

H347
ALUMINA FIBER REINFORCED LITHIUM ALUMINOSILICATE

George K. Layden, Hartford, and Karl M. Prewo, Vernon, both of Conn., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 8, 1986, Ser. No. 883,417
Int. Cl.[4] B32B 5/12
U.S. Cl. 428—113 10 Claims

1. A method for fabricating a fiber reinforced glass matrix composite which comprises the steps of:

(a) pulling a tow of alumina having a plurality of fibers in parallel relationship through an agitated slurry consisting essentially of a finely divided lithium aluminosilicate glass, a carrier liquid and an organic binder, in order to impregnate said tow;

(b) drying and cutting said impregnated tow into a sheet of predetermined shape;

(c) placing a plurality of layers of said sheet into a die;

(d) hot pressing said layers at a temperature and pressure sufficient to form said reinforced composite; and

(e) heat treating the resulting composite structure at an elevated temperature below the softening point of said glass for about 12 to 36 hours.

H348
PENETRATING COMPOUND FOR THE SUPPRESSION OF RUSTY-BOLT INTERMODULATION INTERFERENCE

Ramanathan Panayappan, 11709 Split Tree Cir., Potomac, Md. 20854

Continuation-in-part of Ser. No. 848,423, Apr. 4, 1986, abandoned. This application Jan. 20, 1987, Ser. No. 20,217

Int. Cl.[4] C09K *3/00;* **C23F** *11/18*

U.S. Cl. 106—14.14 **1 Claim**

1. A composition comprising the following:

	% by weight
Polyvinylpyrrolidinone (PVP-K-90)	10
Citric Acid	10
Tetrasodium salt of EDTA	5
Sodium Bicarbonate	5
Erythorbic Acid	50
Sodium Tetraborate Decahydrate	7.5
Sodium Laurylsulfate	2.5
Water	5
Ethylene Glycol	5

H349
INERT SOLID COMPOSITIONS WHICH BECOME CHEMICALLY REACTIVE WHEN MOLTEN

Kenneth Krevitz; Louis L. Pytlewski, both of Philadelphia, and Charles T. Davey, Dresher, all of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 12, 1987, Ser. No. 25,123

Int. Cl.[4] A62D *1/00;* **C08L** *91/06;* **D21D** *3/00*

U.S. Cl. 252—7 **36 Claims**

1. A reagent composition which is chemically inert when solid and is chemically reactive when molten, comprising

(a) a first substance selected from the group consisting of high molecular weight waxes and polymers; and

(b) a second substance dissolved, dispersed, or encapsulated in a solid matrix of said first substance, said second substance being highly chemically reactive and selected from the group consisting of strong bases and strong acids,

whereby when said reagent composition melts, said second substance is exposed for chemical reaction.

H350
ENERGETIC POLYNITRO FORMAL PLASTICIZERS

Horst D. Adolph, Silver Spring, and Kyung E. Kim, Potomac, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 27, 1987, Ser. No. 43,268

Int. Cl.[4] C06B *25/00;* **C07C** *79/343;* **C07B** *43/303*

U.S. Cl. 149—88 **4 Claims**

1. 2,2-dinitropropyl 2,2,2-trinitroethyl formal, $CH_3C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_3$.

2. An energetic plasticizer comprising a mixture of 2,2-dinitropropyl 2,2,2-trinitroethyl formal, bis(2,2,2-trinitroethyl)formal, and bis(2,2-dinitropropyl)formal.

H351
4,4,10,10-TETRANITRO-6,8-DIOXATRIDECANE-1,13-DIOL POLYFORMAL AND METHOD OF PREPARATION

Kyung E. Kim, Potomac, and Horst G. Adolph, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 27, 1987, Ser. No. 43,269

Int. Cl.[4] C08G *65/34;* **C07C** *79/343, 43/303;* **C06B** *45/10*

U.S. Cl. 528—266 **3 Claims**

1. 4,4,10,10-tetranitro-6,8-dioxatridecane-1,13-diol.

2. 4,4,10,10-tetranitro-6,8-dioxatridecane-1,13-diol polyformal having the formula $HO(CH_2)_3C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2(CH_2)_3O[CH_2O(CH_2)_3C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2(CH_2)_3O]_nH$ wherein $n>1$.

H352
BIS(2-FLUORO-2,2-DINITROETHOXY) 2,2,3,3,4,4,4-HEPTAFLUOROBUTOXYMETHANE AND A METHOD OF PREPARATION

William M. Koppes, Adelphi, and Horst G. Adolph, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 1, 1987, Ser. No. 46,345

Int. Cl.[4] C07C *79/343, 43/303;* **C06B** *25/00, 45/10*

U.S. Cl. 568—590 **3 Claims**

1. Bis(2-fluoro-2,2,-dinitroethoxy) 2,2,3,3,4,4,4-heptafluorobutoxymethane, $CF_3CF_2CF_2CH_2OCH[OCH_2CF(NO)_2]_2$.

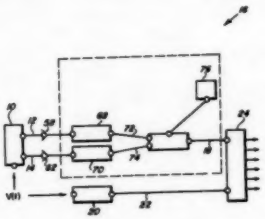
H353
EXTENDED PRECISION IN VIDEO BANDWIDTH ANALOG TO DIGITAL CONVERTER USING OPTICAL TECHNIQUES

Henry F. Taylor, Alexandria, Va., assignor to The United States of America, Washington, D.C.

Filed Mar. 28, 1985, Ser. No. 717,365

Int. Cl.[4] H03M *1/34*

U.S. Cl. 340—347 AD **16 Claims**



1. An optical analog-to-digital converter comprising:

an optical conversion unit including a first electro-optic modulator and a second electro-optic modulator formed from a single mode waveguide for generating optical modulator signal outputs, wherein said modulators are driven in parallel by an input analog signal V(t) and said optical modulator signal outputs are identical except for a relative phase bias θ;

LSB means for detecting, digitizing, and processing the optical modulator signal outputs to form a least significant bits representation LSB of V(t);

MSB means for digitizing said input analog signal V(t) to form a most significant bits MSB representation; and

means for interleaving said LSB representation and said MSB representation to form a final binary representation of said input analog signal V(t).

H354
LINEAR ALGORITHM FOR NON-LINEAR INTERPOLATION FOR COMPUTER AIDED DESIGNS

Stuart H. Rubin, Bethlehem, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 4, 1986, Ser. No. 848,416

Int. Cl.[4] G06F *15/606*

U.S. Cl. 364—491 **1 Claim**

1. A computer process for the automatic layout of multiport, two-dimensional microcircuits comprising the steps of:

(a) defining a general microcircuit layout including an x-y

orthogonal grid, logic cell geometry and relative cell placement, and node interconnections of logic cells;

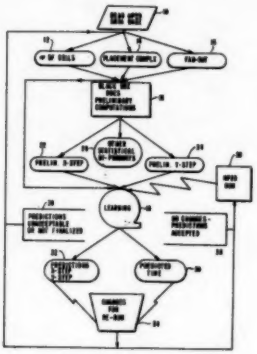
(b) generating an initial placement surface of logic cell rows by establishing cell placements on said orthogonal grid;

(c) exchanging cell pair locations according to multiple criteria in order to optimize cell placement;

(d) exchanging node-connected cell pairs along cell rows to thereby reduce the distance to the nearest connected cells;

(e) establishing routing for pin-to-pin connections;

(f) establishing subchip interior routing;



(g) establishing routing from cell rows to peripheral power connectors;

(h) analyzing routing output for translation to a computer graphics language which is suitable for describing the fabrication layout of the circuit module;

(i) creating power bus routes;

(j) translating placement and connection data into said computer graphics language; and

(k) predicting from the microcircuit layout parameters the microcircuit design or run time and the probable size of the microcircuit.

H355

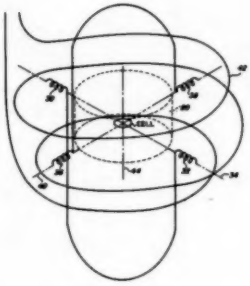
APPARATUS AND METHOD FOR STIRRING FLUID BORNE PARTICLES

Earl F. Skelton, Washington, D.C.; William T. Elam, Alexandria, Va., and Alan W. Webb, Oxon Hill, Md., assignors to United States of America, Washington, D.C.

Filed Jul. 2, 1986, Ser. No. 890,201

Int. Cl.[4] G01N *23/20*; G21K *5/08*

U.S. Cl. 378—80 **18 Claims**



13. A stirrer usable for stirring particles within a fluid pool comprising;

means for imposing magnetic flux on the particles in the pool; and

means for repeatedly changing direction of the magnetic flux;

whereby the particles tumble through the fluid pool into successive orientations as particles having magnetic moment interact with the magnetic flux.

REISSUES

OCTOBER 6, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,513

METHOD FOR DISPENSING AT A VISIBLY DETECTABLE RATE, CONTINUOUSLY OR DISCONTINUOUSLY, FOR DISCRETE PERIODS OF TIME AT A STEADY RATE, A VOLATILE COMPOSITION OF MATTER FROM A CONTAINER INTO THE ATMOSPHERE AS WELL AS THE CONTAINER USED IN THE METHOD

Geoffrey B. Seaber, Ijsselstein, Netherlands; Augustinus G. van Loveren, Ryebrook, and Marina A. Munteanu, New York, both of N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Original No. 4,387,849, dated Jun. 14, 1983, Ser. No. 245,542, Mar. 19, 1981. Continuation of Ser. No. 620,239, Jun. 13, 1984, abandoned. Application for reissue Mar. 21, 1986, Ser. No. 842,486

Int. Cl.[4] A61L *9/04, 9/01, 9/12*

U.S. Cl. 239—6 **5 Claims**

21. A hollow totally enclosed structure comprising a thin shell totally enclosing an inner void, said thin shell having a base portion and an upper portion, said base portion having an inner surface:

(i) at least a finite portion of said thin shell being transparent whereby that portion of said inner void which is located proximate to the base portion of said totally enclosed structure is visible from without said thin shell, in the presence of visible wave-lengths of light;

(ii) contained totally within the said inner void of said thin shell and in place on said inner surface of said base portion, a volatile composition temporarily entrapped and totally entrapped at least at the instant in time of commencement of functional operation of said structure, in a gelatinous entrapment material, said volatile composition being selected from the group consisting of perfume compositions, herbicide compositions, insecticide compositions, animal repellent compositions, air freshener compositions, pheromone compositions, odor maskant compositions, deodorant compositions and insect repellent compositions, said gelatinous entrapment material containing said volatile composition having an upper surface;

(iii) at least a finite section of said upper portion of said thin shell comprising a microporous polymer and termed "a microporous polymer shell section" having a porosity such that when said hollow totally enclosed structure is located in an inert gas at a pressure of less than or equal to about 1 atmosphere, said volatile material molecule are transported at a constant linear velocity and at a constant total derivative of concentration of volatile substance with respect to time onto the inner surface of said microporous polymer section via an adsorption mechanism and from the outer surface of said microporous polymer section to the surrounding atmosphere via a desorption mechanism, said microporous polymer shell section consisting essentially of a polyolefin intimately admixed with a powder having an average particle diameter of from about 0.3 up to about 500 microns, said powder being a filler material incompatible with said polymer, said powder being in a proportion of about 5 to 100 parts by weight per 100 parts by weight of polymer, the said volatile composition having a volatility at ambient conditions which is higher than the transmissibility of said microporous polymer shell section,

the volume of said gelatinous entrapment material being substantially less than the volume of said inner void, there existing at least one substantial void space between (i) said upper surface of said gelatinous entrapment material containing said volatile composition and (ii) said upper portion of said thin shell.

Re. 32,514

POLYMER COMPOSITIONS HAVING A LOW COEFFICIENT OF FRICTION

David J. Steklenski, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

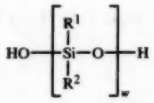
Original No. 4,473,676, dated Sep. 25, 1984, Ser. No. 503,488, Jun. 13, 1983. Division of Ser. No. 388,321, Jun. 14, 1982, Pat. No. 4,404,276. Application for reissue May 12, 1986, Ser. No. 862,346

Int. Cl.[4] C08L *1/28;* **G03C** *1/78*

U.S. Cl. 524—32 **6 Claims**

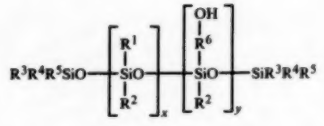
1. A composition comprising a blend of at least 80 percent by weight of a polymer and at least 0.35 percent by weight of a crosslinked [silicone polycarbinol] *member of the group consisting of:*

(a) a hydroxy-terminated polysiloxane of the general structure:



wherein each of R^1 and R^2 is independently selected from the group consisting of hydrogen, alkyl and aryl and w is an integer from about 100 to about 2500, and

(b) a graft hydroxy functionalized polysiloxane having the general structure:



wherein R^1, R^2, R^3, R^4 and R^5 are each independently selected from the group consisting of hydrogen, alkyl and aryl and R^6 is a divalent linking group and x and y are each independently selected from an integer from about 2 to about 15.

Re. 32,515

APPARATUS FOR INCREASING THE SPEED OF A CIRCUIT HAVING A STRING OF IGFETS

Masakazu Shoji, Warren, N.J., assignor to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Original No. 4,430,583, dated Feb. 7, 1984, Ser. No. 316,560, Oct. 30, 1981. Application for reissue Feb. 6, 1986, Ser. No. 827,270

Int. Cl.[4] H03K *19/017, 19/094*

U.S. Cl. 307—448 **11 Claims**

1. An IGFET circuit comprising:

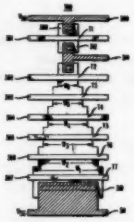
a first terminal for receiving a first operating voltage;

a second terminal for receiving a second operating voltage;

an output terminal for providing an output signal;

load means coupled between the second terminal and the output terminal;

a series string of transistors each having a gate electrode and a conduction channel of a specified width, the string including at least [three] *two* transistors responsive to



input signals at their gate electrodes and coupled between the output terminal and the first terminal and having a positive gradient in conduction channel width in the direction from the output terminal to the first terminal.

Re. 32,516

LOOP SWITCHING SYSTEM

Richard F. Cantwell, Jr., Boulder, Colo., assignor to American Telephone & Telegraph Co., AT&T Bell Labs, Holmdel, N.J.

Original No. 4,393,497, dated Jul. 12, 1983, Ser. No. 255,469, Apr. 20, 1981. Application for reissue Jul. 1, 1985, Ser. No. 750,894

Int. Cl.[4] **H04J** *3/08;* **H04Q** *11/04*

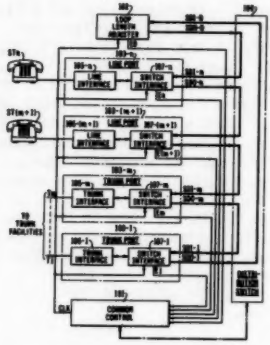
U.S. Cl. 370—89 **18 Claims**

16. A loop communication system comprising:

n terminal devices (T1, 103-1 to Tn, 103-n), each having an input (SDI-i) and an output (SDO-i) terminal;

control means (101) for establishing an order of interconnection for a plurality of said terminal devices (T1, 103-1 to Tn, 103-n);

interconnection means (100) connected to said input (SDI-i)



and said output (SDO-i) terminals of all of said terminal devices (T1, 103-1 to Tn, 103-n) and responsive to said control means (101) for carrying data messages from said output terminal (SDO-(m+1)) of the (m+1)th terminal device (Tm, 103-m) to said input terminal (SDI-m) of the mth terminal device (Tm, 103-m) according to said order of interconnection.

PLANT PATENTS

GRANTED OCTOBER 6, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,031

ROSE PLANT NAMED DE VINE

Stanley G. Marciel, Pleasanton, Calif., assignor to DeVor Nurseries, Inc., Pleasanton, Calif.

Filed Oct. 15, 1985, Ser. No. 787,754
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—18 1 Claim

1. A new and distinct variety of rose plant, substantially as herein shown and described, characterized by its profuse and continuous production of rhodamine pink, flowers of generally large size with vigorous, upright, free branching and rapid growth rate habit.

6,032

ROSE PLANT NAMED DE VINK

Tosh Nakashima, San Leandro, Calif., assignor to DeVor Nurseries, Inc., Pleasanton, Calif.

Filed Sep. 6, 1985, Ser. No. 773,291
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—22 1 Claim

1. A new and distinct rose plant, substantially as herein shown and described, characterized particularly by its fuchsia purple flowers, its profuse and continuous production of flowers of relatively small size, its rapid growth rate, and its vigorous, upright growth habit.

6,033

ALSTROEMERIA NAMED STALAN

Jacob van Andel, 03, Aalsmeer, Netherlands, assignor to Van Staaveren B.V., Aalsmeer, Netherlands

Filed Dec. 6, 1985, Ser. No. 805,717
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of Alstroemeria plant, substantially as herein shown and described, particularly characterized by its generally light Magenta Rose coloration of the lower petals of the flower and the contrasting light Yellow coloration of the uppermost petals which are heavily striped from base to tip.

6,034

ALSTROEMERIA NAMED STALMON

Jacob van Andel, Aalsmeer, Netherlands, assignor to Van Staaveren B.V., Aalsmeer, Netherlands

Filed Dec. 5, 1985, Ser. No. 805,210
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct Alstroemeria variety, substantially as herein shown and described, particularly characterized by its abundant production of small flowers having a distinctive pink, purple and white coloration.

6,035

ALSTROEMERIA NAMED STALRIN

Jacob van Andel, Aalsmeer, Netherlands, assignor to Van Staaveren B.V., Aalsmeer, Netherlands

Filed Dec. 5, 1985, Ser. No. 805,209
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive Alstroemeria variety, substantially as herein shown and described, characterized by its abundant production of very large flowers of a generally orange-red coloration, its abundant foliage, and its tall flowering stems.

PATENTS

GRANTED OCT. 6, 1987

ERRATA

For CLASS	See PATENT NO.
437-235	4,697,328
437-002	4,697,329
437-082	4,697,331
437-029	4,697,332
437-020	4,697,333
450-155	4,697,592
439-061	4,697,858
439-246	4,697,859
439-374	4,697,860
439-027	4,697,861
439-404	4,697,862
439-544	4,697,863
439-444	4,697,864
439-861	4,697,865
211-024	4,697,870
437-141	4,698,104
512-019	4,698,108
525-328	4,698,413
548-361	4,698,436
503-227	4,698,651

PATENTS

GRANTED OCTOBER 6, 1987

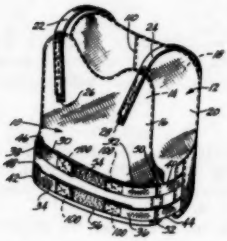
GENERAL AND MECHANICAL

4,697,285

BALLISTICS VEST

William Sylvester, Big Bear City, Calif., assignor to Safariland Ballistics, Inc., Monrovia, Calif.

Filed Aug. 20, 1986, Ser. No. 898,372
Int. Cl.[4] A41D *13/00*; F41H *1/02*
U.S. Cl. 2—2.5 27 Claims



1. A protective vest system comprising:

a front panel for overlying the chest region of a user and having multiple front layers of a flexible and foldable impact-resistant material overlying one another and contained within a flexible and foldable front jacket so that the front layers are free-floating relative to one another within the front jacket to thereby provide a flexible and foldable front panel;

elongated flexible and foldable strap-like front fasteners rigidly affixed to peripheral regions of the overlying front layers of the front panel, so the front fasteners extend freely from opposite sides of the front panel;

a front carrier of a flexible and foldable material containing the front panel with the front fasteners extending from the contained front panel to the exterior of the front carrier;

a rear panel for overlying the back of a user, the rear panel having multiple rear layers of a flexible and foldable impact-resistant material overlying one another and contained within a flexible and foldable rear jacket such that the multiple rear layers are free-floating relative to one another within the rear jacket to thereby provide a flexible and foldable rear panel;

elongated flexible and foldable strap-like rear fasteners rigidly affixed to a peripheral regions of the overlying rear layers of the rear panel, so the rear fasteners extend freely from opposite sides of the rear panel;

a rear carrier of a flexible and foldable material containing the rear panel with the rear fasteners extending from the contained rear panel to the exterior of the rear carrier; and

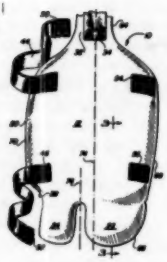
cooperating fastening means on the free end portions of the front and rear fasteners for securing the front and rear panels to the body of a user, thereby maintaining the front and rear panels in a comfortable, flexible condition on the chest and back regions of the user while the attachments of the front and rear fasteners to the front and rear panels, respectively, maintain the multiple overlying impact-resistant layers therein in a fixed position sufficient to absorb impact substantially without disturbing the overlying relation of the free-floating layers.

4,697,286

PROTECTIVE THIGH AND KNEE GEAR

Soo S. Cho, Roseland, Fla., assignor to Macho Products, Inc., Palm Bay, Fla.

Filed Jun. 13, 1986, Ser. No. 874,214
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—22 7 Claims



1. For use by a participant in martial arts activities or the like, an improved protective device for the thigh and knee of the wearer including:

a main body portion formed of a resilient, comformable foam having a pliable coating, the main body portion having an enlarged main section, an upwardly extending section, a downwardly extending larger lower section and a downwardly extending smaller lower section, the main body portion having an upper and lower edge and an interior and exterior edge, the downwardly extending larger lower section and the downwardly extending smaller lower section being separated by a recess with the recess being located closer to the exterior edge than the interior edge and strap means attached to the main body portion to secure the main body portion to the thigh and knee of a wearer.

4,697,287

PROTECTIVE COVERING FOR AN ADULT AND CHILD DURING FEEDING OF THE CHILD

James N. Rose, 2435 Biscayne Bay Dr., Miami, Fla. 33181

Filed Dec. 4, 1986, Ser. No. 937,699
Int. Cl.[4] A41B *13/10, 1/20*
U.S. Cl. 2—49 **8 Claims**

1. A protective covering structure for both an adult and infant during feeding of the infant, since structure comprising:

a. a base formed of flexible material and having a substantially elongated configuration terminating at oppositely exposed transverse ends,

b. an aperture formed in said base and including a periphery dimensioned to at least partially surround the neck of the adult,

c. said aperture spaced from said transverse ends and disposed inwardly from oppositely disposed longitudinal sides of base,

d. said base including a first portion extending from said aperture to a first of said transverse ends a sufficient distance to dispose said first transverse end at least in alignment with the shoulder blades of the adult,

e. said base including a second portion extending from said aperture a sufficient distance to dispose said second transverse end substantially adjacent at the waist of the adult,

f. said first and said second portions including a transverse dimension sufficient to dispose said base in a draped orientation over the shoulders of the adult and continuously from the shoulder blades to the waist of the adult,

g. at least one cut-out portion formed in adjacent and spaced relation from and communicating with the said second transverse end, said one cut-out portion being dimensioned to surround the neck of the infant, and

h. said aperture and said one cut-out portion disposed a sufficient spaced distance from one another for concurrent and respective engagement with the necks of the adult and of the infant, and in covering relation to frontal portions of both when the adult holds the infant during feeding.

4,697,288

CONVERTIBLE GARMENT

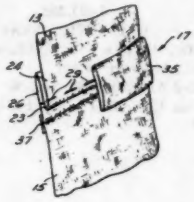
Angeline Palumbo, 27703 Ortega Hwy., No. 96, San Juan Capistrano, Calif. 92675

Filed Apr. 7, 1986, Ser. No. 848,773
Int. Cl.[4] A41D *27/10, 17/02*
U.S. Cl. 2—269 R **8 Claims**

1. A garment formed of material which presents both its upper and lower portions to the exterior of the garment and convertible in length comprising:

a first fold formed intermediary in the material between its upper and lower portions, said fold comprising an upper fold portion and a lower fold portion;

removable stiches holding said fold in place, said stiches being removable to allow said lower fold portion to extend downwardly to thereby increase the length of the garment; and



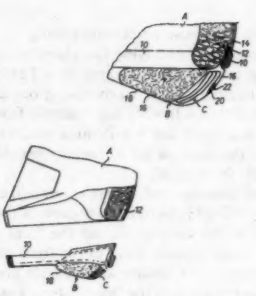
a waistband connected to the material at said upper fold portion by said removable stiches said waistband substantially overlapping and concealing said removable stiches.

4,697,289

PROTECTIVE DEVICE APPLICABLE TO HELMETS, ESPECIALLY FOR SPORTS USE

Nava P. Luigi, Bergamo, Italy, assignor to Nava & C. S.p.A., Verderio Superiore, Italy

Filed Jul. 3, 1985, Ser. No. 752,249
Claims priority, application Italy, Sep. 10, 1984, 22588A/84
Int. Cl.[4] A42B *3/00*
U.S. Cl. 2—422 **21 Claims**



12. A protective device for helmets comprising an envelope (B) which is at least partly flexible and provided with an annular element (10) adapted to forcibly engage the lower edge of helmet (A) in order to removably secure said envelope to the helemt (A), said envelope (B) being adapted to house an extensible, flexible protective screen (C) when the protective device is secured to the helmet and when the protective device is removed from the helmet, said protective screen can be secured externally along the helmet's lower opening to form a protection for the wearer's neck, said envelope (B) containing an opening (20) being adapted to receive said flexible screen when the screen is not in use.

4,697,290

DEVICE COMPRISING A MATTRESS SUPPORT

Lars E. Alklind, Hagfors, and Eric Nilsson, Kungsängen, both of Sweden, assignors to Regionala Stiftelsen i Varmland med firma Erress, Hagfors, Sweden

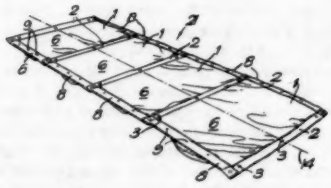
Filed May 12, 1986, Ser. No. 862,251
Int. Cl.[4] A47C *27/10*
U.S. Cl. 5—61 **5 Claims**

1. A device to facilitate the care of bed patients comprising a support structure to be placed underneath a mattress having a first longitudinal center line, a predetermined length and a

predetermined width; said support structure comprising at least three sequentially connected identical sections; each of said sections comprising

a rigid, substantially rectangular, planar member having a width substantially equal to said predetermined width of said mattress, a first pair of opposed widthwise edges, a top planar surface, supportingly receivable of said mattress, disposed between said first pair of widthwise edges, a bottom planar surface disposed between said first pair of widthwise edges and a second longitudinal center line alignable with said first longitudinal center line,

an envelope releasably enclosing said planar member, said envelope including a second pair of widthwise edges corresponding to said first pair of widthwise edges and at



least two deformable chambers contacting said bottom planar surface of said planar member, at least one of said deformable chambers located on each side of said second longitudinal center line,

connection means, located on said second pair of widthwise edges, for releasably articulatably connecting adjacent sections along their respective adjacent widthwise edges,

at least one independently inflatable cell, disposed in each of said deformable chambers, for deforming said chambers away from said bottom planar surface to incline said planar member in the transverse direction,

wherein said inflatable cells may independently deform said deformable chambers to produce a maximum inclination of said planar member to a horizontal plane of 10 degrees.

4,697,291

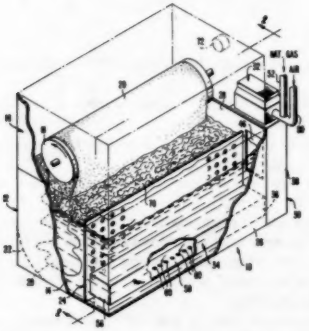
CARPET DYEING APPARATUS AND METHOD

Richard C. Shepherd, 3108 Chatsworth Rd., Dalton, Ga. 30720, and C. Robert Safarik, 15704 Gardenside La., Tampa, Fla. 33624

Continuation of Ser. No. 719,501, Apr. 3, 1985, abandoned. This application Jan. 7, 1987, Ser. No. 4,741

Int. Cl.[4] D06B *3/20, 23/22*

U.S. Cl. 8—151 **33 Claims**



1. A method of heating a dye solution in a dye bath for use in dyeing a textile article and the like placed in the dye solution comprising generating a pressurized high temperature stream of gas by burning fuel in a flow of pressurized air, and discharging the high temperature gas into the dye solution in a manner providing bubbling of the gas through the dye solution accompanied by heat transfer between the gas and the dye solution effective to heat the dye solution to a temperature effective for dyeing the article.

11. Apparatus for dyeing textile articles and the like comprising container means defining a dye bath for containing dye solution, and heating means for the dye solution comprising means for generating a pressurized high temperature stream of gas by burning a fuel in a flow of pressurized air, and means for discharging the pressurized high temperature gas directly into the dye solution in a manner providing bubbling of the gas throughout the dye solution accompanied by heat transfer between the gas and the dye solution effective to heat the solution to a temperature effective for dyeing.

4,697,292

SHOWER PIPES FOR ROTARY DRUM FILTER

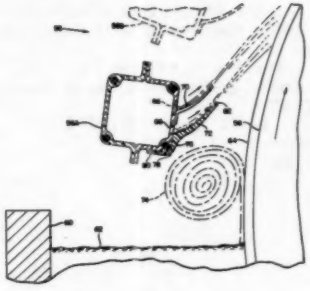
Richard W. LaValley, Vancouver, Wash., assignor to LaValley Industrial Plastics, Inc., Vancouver, Wash.

Continuation-in-part of Ser. No. 703,033, Feb. 19, 1985, Pat. No. 4,670,099, which is a division of Ser. No. 464,023, Feb. 4, 1983, Pat. No. 4,522,716, and a continuation-in-part of Ser. No. 709,450, Mar. 8, 1985, which is a continuation-in-part of Ser. No. 464,023, Feb. 4, 1983, Pat. No. 4,522,716. This application Jul. 18, 1985, Ser. No. 756,769

The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.

Int. Cl.[4] D06B *1/02*

U.S. Cl. 8—156 **33 Claims**



29. A method of preventing roll-up or excessive stock thickness of a pulp stock mat on the surface of a rotary drum filter to protect a bank of shower pipes arranged along the upwardly rotating surface of the drum from damage, said method comprising:

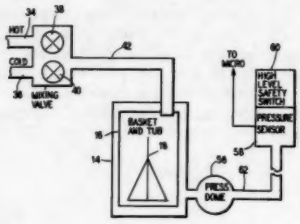
reinforcing the lowermost spray diffusion flange on the lowermost shower pipe in the bank and reinforcing the connection of said flange with said lowermost pipe so as to resist deflection when engaged by pulp stock on the drum, and positioning the outer end of said flange closer to the drum surface than the other flanges in said bank, so that said reinforced flange provides a striker blade for limiting the thickness of the mat of pulp stock on the drum surface that can pass by said lowermost flange.

4,697,293

PRESSURE SENSING AUTOMATIC WATER LEVEL CONTROL

Donald E. Knoop, Royalton Township, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 31, 1985, Ser. No. 815,403
Int. Cl.[4] D06F *33/08*
U.S. Cl. 8—158 **18 Claims**



18. A method of controlling the amount of liquid in a liquid treatment machine comprising:

placing a specific mass of material to be treated in a container in the machine;

filling the machine with liquid;

agitating the material and liquid in the container during the filling step in an oscillatory manner;

measuring the head pressure of the liquid during the agitating step;

determining and storing the range of pressures during periods of oscillation;

comparing a current range with a previously stored largest range;

calculating an optimum value of additional liquid to be added based on the amount of liquid in the container and the differences in pressure ranges, and

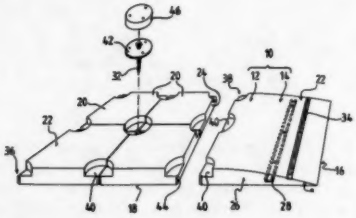
introducing additional liquid in an amount to achieve said optimum value.

4,697,294

SPEED BUMPS FOR ROADWAYS

Hartmut Schäfer, Ringstrasse 2, 5000 Cologne 50, Fed. Rep. of Germany

Filed Sep. 20, 1985, Ser. No. 778,511
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 8427790[U]
Int. Cl.[4] E01D *1/00*; E01F *13/00*
U.S. Cl. 14—69.5 **20 Claims**



1. A modular inclined ramp structure for mounting on a roadway surface, comprising:

a plurality of solid ramp plates, each having a flat platform section, a sloping section leading to the flat platform section and a rounded transitional section therebetween, each ramp plate being made of resilient, energy-absorbing material which deforms elastically when driven over and each ramp plate having a reinforcing and fixing strip extending along the sloping section, running parallel to a lowermost edge of the sloping section, each ramp plate being fixable to the roadway surface by means inserted through each ramp plate along the reinforcing and fixing strip;

reflecting means embedded in the sloping section of each ramp plate;

a plurality of solid spacer plates, each having a flat upper surface aligned with the platform sections of the ramp plates and being abuttable against any ramp plate at a side of the ramp plate opposite the lowermost edge and abuttable against other spacer plates along any edge, the ramp and spacer plates having blunt contact surfaces for abutting one another;

a plurality of inserts for securing the ramp and spacer plates to one another, each of the ramp and spacer plates having recesses at corners of the abuttable contact surfaces, the recesses of abutted ramp and spacer plates forming composite recesses for receiving the inserts; and,

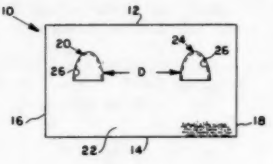
threaded means mountable through the inserts for attachment into the roadway surface, whereby a plurality of inclined ramp structures may be formed by interconnection of different numbers of the ramp plates and the spacer plates in different geometrical configurations and each lowermost edge and part of each sloping section adjacent each lowermost edge is substantially prevented from bending and deflecting upwardly when driven over.

4,697,295

FLOOR CLEANING DEVICE

Gail W. Garrison, 3250 E. De Bazan Ave., St. Petersburg Beach, Fla. 33706

Filed Oct. 8, 1986, Ser. No. 916,797
Int. Cl.[4] A47L *13/18, 13/282*
U.S. Cl. 15—227 **3 Claims**



1. An article of manufacture useful for cleaning floors, comprising:

a flat, flexible, absorbent cleaning member of predetermined configuration;

said cleaning member having a top surface and a bottom surface;

a pair of substantially laterally spaced pocket members formed on said top surface;

each of said pocket members being of sufficient dimension to slideably receive therein at least a portion of a human foot;

said pocket members being spaced sufficiently far apart to allow an individual with a foot in each pocket to walk without tripping,

and a pair of substantially laterally spaced pocket members formed on the bottom surface of said cleaning member;

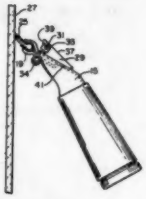
whereby the cleaning member may be inverted and its use continued when one surface thereof has exhausted its cleaning capacity.

4,697,296

SQUEEGEE

Michael A. Smahlik, Oakland, Calif., assignor to Steccone Products Company, Inc., Oakland, Calif.

Filed Aug. 19, 1985, Ser. No. 767,171
Int. Cl.[4] A47L *13/11*
U.S. Cl. 15—245 **12 Claims**



1. In a squeegee having a handle with a flared portion and a gripping portion, a support channel holding the wiping blade of the squeegee, and clamping means securing said support channel to the handle, the improvement comprising

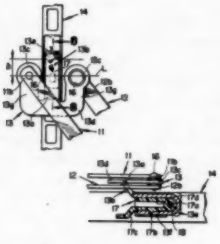
said clamping means being releasable by a pivoting clamping member disposed on the upper surface of the flared portion of the squeegee handle and which can be actuated to either a released or locked position by downward pressure on the front or rear end of the clamping member, respectively, whereby the support channel can be easily partially released for controlled sliding lateral movement in said clamping means with respect to the squeegee handle, said clamping member in locked position having a smooth transition surface at the rear end thereof disposed proximate the gripping portion of the squeegee handle.

4,697,297

WINDSHIELD WIPER

Toshio Kobayashi, Hadano, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Nov. 7, 1985, Ser. No. 795,922
Claims priority, application Japan, Nov. 13, 1984, 59-237558
Int. Cl.[4] B60S *1/40*
U.S. Cl. 15—250.23 **15 Claims**



1. A windshield wiper comprising:

a wiper blade;

main and auxiliary arms connected to said wiper blade and swingingly movable upon being driven;

a bridge member having first and second pivot sections to which said main and auxiliary arms are pivotally connected at their first end sections, respectively, so that said main and auxiliary arms are in nearly parallel relationship with each other, said pivot sections defining pivot axes; and

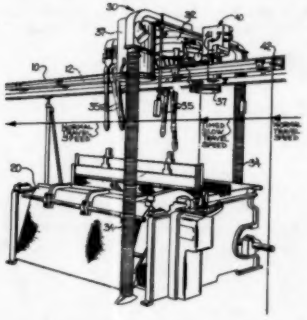
an installation section to which said wiper blade is installed, said installation section being integral with said bridge member and having a base portion through which said installation section protrudes from said bridge member, said base portion being spaced from a plane passing through said bridge member first and second pivot sections and containing the pivot axes, said base portion being located on a first side of said plane, said installation section extending beyond said plane to a second side of said plane, and said first and second sides being opposite to each other with respect to said plane.

4,697,298

TRAVELING CLEANER SYSTEM

William L. Mulligan, Charlotte, N.C., assignor to Parks-Cramer Company, Fitchburg, Mass.

Filed Sep. 30, 1986, Ser. No. 913,510
Int. Cl.[4] A47L *5/38*
U.S. Cl. 15—312 R **15 Claims**



1. A traveling cleaner system for cleaning textile machinery arranged in rows in a textile mill comprising:

a traveling cleaner unit including means for directing a cleaning current of air onto the textile machinery,

means mounting said traveling cleaner unit above the textile machinery for movement along a predetermined path of travel along the rows of textile machinery so as to direct the cleaning current of air onto the underlying textile machinery, and

means responsive to the traveling cleaner unit passing preselected areas of the textile mill for temporarily altering the rate of travel of the traveling cleaner unit so as to achieve more efficient cleaning of certain areas of the textile mill.

4,697,299

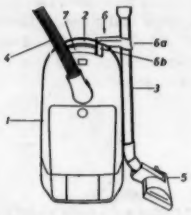
VACUUM CLEANER HAVING A VACUUM HOSE HOLDER

Helmut Brinkhoff, Werther; Gunter Gloning, and Heinz-Gunter Steinkotter, both of Bielefeld, all of Fed. Rep. of Germany, assignors to Miele & Cie. GmbH & Co., Gutersloh, Fed. Rep. of Germany

Filed Oct. 27, 1986, Ser. No. 923,664
Claims priority, application Fed. Rep. of Germany, Oct. 25, 1985, 3537936
Int. Cl.[4] A47L *9/00*
U.S. Cl. 15—323 **15 Claims**

1. In a vacuum cleaner, such as a floor vacuum cleaner having a housing, a carrying handle, a vacuum hose, a vacuum hose pipe, and a vacuum hose pipe rack mounted on the cleaner housing, the improvement comprising said vacuum

hose pipe rack being formed in a two-part structure, consisting of a pipe holder adapted to slide onto the vacuum hose pipe



and a mount on the vacuum cleaner housing for the pipe holder.

4,697,300

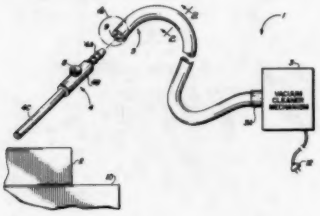
ANTISTATIC VACUUM CLEANER AND METHOD

Stephen M. Warlop, 5905 E. 5th St., Tucson, Ariz. 85711

Filed Oct. 8, 1986, Ser. No. 916,657

Int. Cl.[4] H05F *3/00*

U.S. Cl. 15—327 R **9 Claims**



1. An apparatus for providing electrical isolation between a vacuum source and sensitive equipment being vacuumed and simultaneously avoiding electrostatic discharges from the vacuum pickup to the sensitive equipment, the apparatus comprising in combination:

(a) a vacuum pickup having a vacuum hose connector at one end and a vacuum intake nozzle at another end;

(b) a flexible plastic vacuum hose composed of electrically insulative material and having a first end connected to a vacuum inlet of the vacuum source and a second end connected to the vacuum hose connector;

(c) a continuous, electrically floating helical conductor embedded entirely within the wall of the vacuum hose and extending from the first end to the second end thereof;

whereby electrical isolation between the vacuum pickup and the vacuum source and avoidance of electrostatic discharge from the vacuum pickup to the sensitive equipment being vacuumed are simultaneously achieved.

4,697,301

BLACKBOARD RUBBER MADE OF, OR INCLUDING, METAL

Jos Palmans, Sint-Huibrechts-Lille, Belgium, assignor to Alliance Enamelsteel Corporation S.A., Belgium

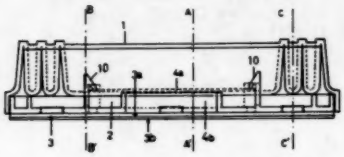
Filed Dec. 27, 1985, Ser. No. 814,103

Claims priority, application Luxembourg, Jan. 28, 1985, 85745

Int. Cl.[4] B43L *19/04*

U.S. Cl. 15—426 **11 Claims**

1. Blackboard rubber made of or including part metal, characterized by the fact that it is essentially made up of two parts enclosed one within the other of which a first part has the general shape of a rectangular box and of which the second part is of a generally flat shape the dimensions of which are such that this part can be placed on and in the first part in such



manner as to form the missing face of the first part and that the said second part includes a metal plate to which is attached a magnet.

4,697,302

SPRING OPERATED AUTOMATIC DOOR AND WINDOW CLOSING HINGE

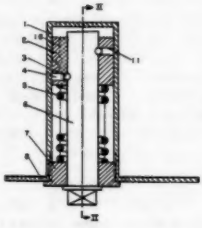
Sun Yuenian, P.O. Box 5106-6, Hai Dain District, Beijing

Filed Apr. 1, 1986, Ser. No. 846,746

Claims priority, application China, Apr. 1, 1985, 85200341

Int. Cl.[4] E05F *3/14*

U.S. Cl. 16—52 **5 Claims**



1. An automatic closing device for a door or window comprising a center shaft provided with two spiral channels on its surface and secured on the ground, each spiral channel having a V-shaped section, each V-shaped section having two horizontal sections respectively disposed at opposite ends thereof, steel balls rolling in said spiral channels, a floating piston which forms a screw-and-thread pair with said center shaft by means of said steel balls, said floating piston having two flat surfaces thereof, a housing with a flange adapted to be secured to the door or window, two sliding pieces symmetrically fixed to an upper portion of said housing disposed adjacent said flat surfaces of said floating piston for converting rotational movement of said housing into linear movement of said floating piston or vice versa, and a spring normally urging said piston into said housing.

4,697,303

WITHDRAWAL APPARATUS FOR A CARD-LIKE STRUCTURE

Kazuhiro Matsui, Toyoake; Mitsuru Tanigawa, Yokkaichi, and Haruyuki Sugiura, Kariya, all of Japan, assignors to Kitagawa Industries Co., Ltd., Nagoya, Japan

Filed Apr. 30, 1986, Ser. No. 857,317

Claims priority, application Japan, Jul. 2, 1985, 60-145632

Int. Cl.[4] B25G *3/04, 3/18*

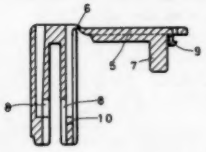
U.S. Cl. 16—112 **5 Claims**

1. A withdrawal apparatus for card like structures, comprising:

a body having two rigidly connected parallel sides defining a channel therebetween;

a movable member pivotally connected to said body via a flexible hinge;

an aperture in at least one of said sides;



a pin mounted on said movable member at a position such that said pin fits into said aperture and extends through said channel upon pivoting of said movable member; and

means formed on said body and said movable member for retaining said pin fitted into said aperture.

4,697,304

FRICTION CONTROLLED WINDOW BALANCE

Bruce L. Overgard, Colton, S. Dak., assignor to The Celotex Corporation, Tampa, Fla.

Filed Jul. 11, 1986, Ser. No. 884,812

Int. Cl.[4] E05F *1/16*

U.S. Cl. 16—198 **3 Claims**

1. In a friction controlled window balance comprising a U-shaped channel member with a single coil spring positioned therein and anchored to a fixed anchor unit at one extremity of said channel member, said U-shaped channel having a rear wall and two upstanding side walls, said side walls being integrally connected along respective longitudinal edges of said rear wall, a floating anchor connected to the other extremity of said coil spring and having a plural groove roller unit journalled therein, a second fixed anchor unit having a plural grooved roller unit journalled therein, and a balance cord connected to said floating anchor unit and to said second fixed anchor unit, and wound alternatively in loops around journalled roller units of said floating and second fixed anchor units in the grooves therein, the improvement comprising a non-resilient friction drag element located between said second fixed anchor unit and said floating anchor unit and being in constant frictional contact with multiple lengths of loops of said cord, said friction drag element being connected to and spanning said two upstanding side walls.

4,697,305

RELEASE MECHANISM FOR LOCKING HINGE FOR MULTI-POSITIONED LADDER

Lee H. Boothe, American Fork, Utah, assignor to Harold R. Wing, Springville, Utah

Continuation of Ser. No. 701,735, Feb. 14, 1985, abandoned. This application Nov. 21, 1986, Ser. No. 934,570

Int. Cl.[4] E05D *11/10*

U.S. Cl. 16—329 **9 Claims**

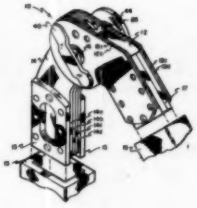
1. An improved hinge and release mechanism for collapsible ladders, said hinge being of the type wherein first and second members each have a head portion and a ladder stringer-engaging portion, the first and second members being pivotally engaged for rotation about a pivotal axis extending generally perpendicularly through a circular pivot aperture in said head portions and having respective first locking apertures which are at radially spaced positions from the pivotal axis and can be selectively aligned or misaligned by mutual rotation of said first and second members about the pivotal axis, and at least one locking pin which is selectively inserted through the locking apertures, when aligned, to adjust the hinge from an unlocked to a locked position, thereby preventing mutual rotation of the first and second members, the improved hinge further comprising:

(a) a tubular hub member having an inner diameter slightly smaller than a diameter of the pivot aperture in the head portions of the first and second members and adapted for being journalled therein, said tubular hub member one end being a locking end, and the other opposite being an unlocking end, and a longitudinal axis corresponding to the pivotal axis, and further having an opening therethrough which forms a guide aperture about the longitudinal axis;

(b) a guide shaft disposed in the hub member for both (i) axially slidable translation between extended and retracted positions with respect to the locking end of the hub member and along the longitudinal axis through the guide aperture, and (ii) rotation within the guide aperture about the longitudinal axis;

(c) a handle member disposed completely outside the hub member and being secured to the guide shaft adjacent the unlocking end of the hub member and extending outwardly from the longitudinal axis approximately to the radially spaced position of the first locking apertures, said locking pin being secured to the handle member and being oriented in mating relationship with respect to the first locking apertures when in common alignment;

(d) bias means for applying an axial biasing force to the guide shaft to urge the guide shaft toward the retracted position wherein the aligned locking pin and locking apertures are in a locked and mated configuration;



(e) a hinge release mechanism comprising:

(1) a release plate having a contact side and an opposing operating side with a plate diameter exceeding the inner diameter of the tubular hub member, said contact side being adapted for depression toward the hub member;

(2) a first annular flange having an axial length projecting toward the hub member from the operating side of the plate and having a tubular cross-sectional configuration which is characterized by an inner tubular diameter which is slightly larger than the outer diameter of the hub member;

(3) a second annular flange having an axial length substantially equal to the axial length of the first annular flange projecting toward the hub member from the operating side of the plate and having a tubular cross-sectional configuration which is characterized by an outside tubular diameter which is slightly smaller than the inside diameter of the hub member, such that in combination with the first annular flange, said second annular flange forms an annular channel such that said hub member can telescopically mate within the annular channel when the guide shaft is in the partially extended position, whereby the hub is held within said annular channel and lateral movement of the hub is prevented;

(4) means for coupling the guide shaft in fixed rotational attachment to the release plate at a central portion thereof and within an area enclosed by the annular flanges;

(f) means for housing said bias means in direct physical

contact between the hinge release mechanism and the locking end of the tubular hub member, and

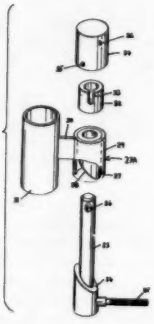
(g) retaining means for holding the first and second members in a juxtaposed position at a fixed location along the longitudinal axis and mounted on the periphery of the hub member wherein the means for coupling the guide shaft and release plate in fixed rotational attachment comprises a second shaft, said second shaft and said second annular flange including means for attachment, said means for attachment comprising a radial bore in the second annular flange and the second shaft, respectively, having common alignment and being sized to fit a locking pin which comprises part of the coupling means and which is inserted into the bore to lock the shaft and release plate in fixed axial rotation; said second flange encloses a locking recess adapted to receive the second shaft and including a bore aligned with the bore of the first flange and extending diametrically through both sides of second flange to enable insertion of said locking pin through the first flange and into the two respective bore openings of the second flange and the bore of the second shaft.

4,697,306

SELF-CLOSING CHILD-PROOF HINGE/LOCK MECHANISM

Bernard J. Rhodes, 21 Keera Street, Coorparoo, Brisbane, Queensland, 4151, Australia

Continuation-in-part of Ser. No. 508,154, Jun. 24, 1983, abandoned. This application Jul. 17, 1985, Ser. No. 756,040
Claims priority, application Australia, Jul. 17, 1984, PG6044
Int. Cl.[4] E05F *1/04*
U.S. Cl. 16—317 **10 Claims**



1. A self-closing lockable hinge system including:

a pin member having a longitudinal axis and a sleeve member rotatable about said pin member, said pin member and said sleeve member having associated therewith mutually engagable surfaces such that upon rotation of one of said members relative to the other, said sleeve member, as a result of the engagement of said mutually engagable surfaces, is axially movable along said longitudinal axis of said pin member from a lower closed position to an upper open position relative to the pin member;

a stop located on the pin member and spaced away from said sleeve member;

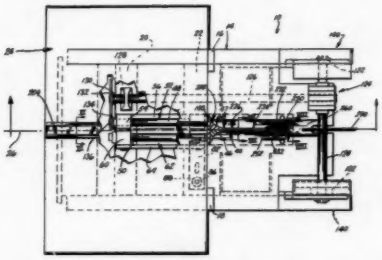
a register means surrounding the pin member between the stop and the sleeve member and fixably and manually rotatable about said pin member for alignment with said stop, said register means being alignable to a first position wherein said axial movement of said sleeve along said pin's longitudinal axis is permitted and alignable to a second position wherein said axial movement of said sleeve along said pin's longitudnal axis is prevented.

4,697,307

CHICKEN THIGH SKINNER

Eugene G. Martin, New Holland, and Harold C. Martin, Lancaster, both of Pa., assignors to Favorite Manufacturing, Inc., New Holland, Pa.

Filed Jan. 22, 1986, Ser. No. 821,419
Int. Cl.[4] A22C *21/00*
U.S. Cl. 17—11 **25 Claims**



1. An apparatus for removing the skin from the meat of a poultry part such as a chicken thigh, said apparatus comprising:

a main frame;

a support plate adjustably positioned on said frame, said support plate defining an elongated, generally Y-shaped slot having a leg and angled arms, said slot arms bounding a spear portion, said support plate further defining a groove extending along said spear portion;

a conveyor supported on said frame above said support and extending along said slot and said groove; and

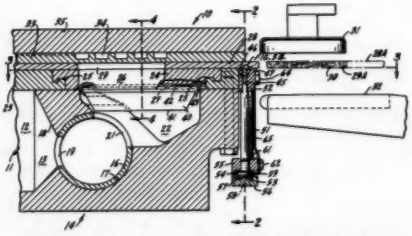
skinning means on said frame and extending beneath said support plate along said slot for removing the skin from a poultry part as it is moved along said slot by said conveyor, said spear portion of said support plate removing any loose skin not removed by said skinning means.

4,697,308

PATTY MOLDING MECHANISM FOR WHOLE FIBER FOOD PRODUCT

Glenn A. Sandberg, Lockport, Ill., assignor to Formax, Inc., Mokena, Ill.

Filed Oct. 29, 1986, Ser. No. 924,562
Int. Cl.[4] A22C *7/00*
U.S. Cl. 17—32 **17 Claims**



1. A molding mechanism for molding food patties from a whole fiber food product, comprising:

a fill member having a planar surface and having at least one fill aperture through that surface;

a cover member having a planar surface disposed in parallel spaced relation to the planar surface of the fill member;

a mold plate having opposed planar surfaces, positioned between the planar surfaces of the fill member and the cover member in close fitting relation thereto, the mold

plate having at least one mold cavity of given maximum width W1 therethrough;

mold plate drive means for cyclically moving the mold plate between a fill position in which the mold cavity is aligned with the fill aperture and a discharge position in which the mold cavity is displaced a short distance beyond one side of the fill member;

pump means for pumping a whole fiber food product, under pressure, through the fill aperture and into the mold cavity to form a food patty in the mold cavity;

knockout means for pushing a molded food patty from the mold cavity at the discharge position of the mold plate;

a shear blade, having a linear shearing edge with a width W2 substantially exceeding the maximum mold cavity width W1, positioned adjacent the one side of the fill member and actuatable between an unactuated position, in which its shearing edge does not project substantially beyond the level of the planar surface of the fill member toward the mold plate, and a shearing position in which its shearing edge projects a very short distance beyond the level of the planar surface of the fill member toward the mold plate; and

shear blade drive means for cyclically actuating the shear blade in coordination with movement of the mold plate, driving the shear blade to its shearing position as the mold plate moves toward its discharge position to shear food product fibers trailing from the side of the mold cavity adjacent the fill member, and releasing the shear blade to return to its unactuated position before the mold plate begins to return to its fill position.

4,697,309

DUAL CHUTE FIBER TUFT FEEDING APPARATUS

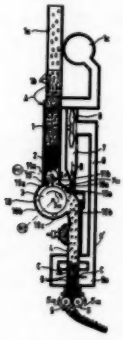
Dieter Rudolph, Mönchengladbach, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Feb. 10, 1986, Ser. No. 827,742

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1985, 3504607

Int. Cl.⁴ D01G *15/40*

U.S. Cl. 19—105 **8 Claims**



1. In an apparatus for feeding a fiber lap to a card, including an upper reserve chute having an upper end through which fiber material is introduced into the apparatus, a feed roller situated at a lower end of said reserve chute and arranged for withdrawing fiber material from said reserve chute; a feed chute having an upper end situated adjacent to the lower end of said reserve chute; an opening roller situated in a space between the lower end of the reserve chute and the upper end of the feed chute; said opening roller being arranged under the feed roller to receive fiber material therefrom and to advance the fiber material into said feed chute through the upper end thereof; delivery rollers arranged at a lower end of said feed chute for withdrawing fiber material therefrom as a fiber lap; and air circulating means for introducing a compressing air stream through the upper end of said feed chute, driving the air stream through said feed chute to compress fiber material therein and withdrawing air from openings in a lower portion of said feed chute, the improvement comprising means for rotating said feed roller and said opening roller simultaneously in opposite directions relative to one another; and means, forming part of said air circulating means, for guiding the compressing air stream adjacent said opening roller codirectionally with the rotary direction thereof.

4,697,310

DEVICE FOR EXCHANGING EMPTY CANS WITH CANS FILLED WITH SLIVER

Hans Raasch, Moenchengladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Moenchengladbach, Fed. Rep. of Germany

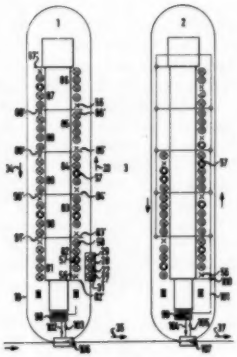
Filed Feb. 14, 1986, Ser. No. 829,536

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1985, 3505495

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.⁴ B65H *67/02*

U.S. Cl. 19—159 A **5 Claims**

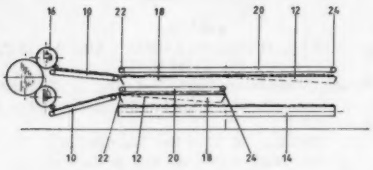


1. Device for exchanging empty cans with cans filled with sliver at a machine for processing the sliver having set locations for the cans, comprising a mobile transport device automatically drivable along a floorlike travel path at the machine, said mobile transport device having a loading device for empty cans and an unloading device for filled cans, the sliver-processing machine being subdivided into sections, the set locations for the cans being at respective specific locations of said sections, said transport device having at least one sensor for recognizing the presence of a can disposed at one of the set locations, and at least another sensor for recognizing the presence of sliver filling said last-mentioned can, said loading device being controllable by said sensors, respectively, for recognizing the presence of an empty can at a respective set location, and said unloading device being also controllable by said sensors, respectively, for recognizing the absence of a can at a respective set location, said transport device also having at least one sensor for recognizing the sections of the sliver-processing machine; drive means for said mobile transport device; and means for operatively connecting said sensors to said drive means and controlling said drive means in response to at least one of said sensors for performing at least one of the functions consisting of recognizing the presence of empty cans and the absence of cans at the respective set locations and recognizing respective sections and boundaries of said sections.

4,697,311
APPARATUS FOR THE MANUFACTURE OF A NONWOVEN FABRIC

Siegfried Bernhardt, Taklerstr. 15, 2820 Bremen 71, and Hans Schmidgen, Korbweide 15, 2820 Bremen 70, both of Fed. Rep. of Germany

Filed Aug. 6, 1986, Ser. No. 893,653
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528140
Int. Cl.[4] D04H *11/04*
U.S. Cl. 19—161.1 6 Claims



1. An apparatus for the manufacture of a nonwoven fabric whose width exceeds the working width of a carding device, comprising:

a plurality of take-down devices receiving the output of said carding device,

a pair of spaced deflector means cooperating with said take-down devices,

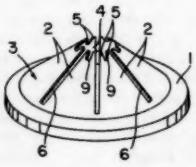
a stationary bottom table disposed between a take-down device and a deflector means, said bottom table extending over the full width of the nonwoven fabric supplied by said take down devices, and

an endless conveyor belt spaced above said bottom table by a distance such that its lower belt portion is in contact with the upper side of a nonwoven fabric lying on said bottom table, said conveyor belt being positioned to convey the nonwoven fabric from a take-down device to a deflector means, the surface of said bottom table having a coefficient of friction with respect to said nonwoven fabric which is significantly lower than that between said nonwoven fabric and the lower belt portion of said conveyor belt.

4,697,312
DEVICE FOR CARRYING AND CLOSING BAGS

Hendrik Freyer, Laren, Netherlands, assignor to Haagexport, B.V., Netherlands

Filed Oct. 7, 1986, Ser. No. 916,203
Int. Cl.[4] B65D *77/10*
U.S. Cl. 24—30.5 S 4 Claims

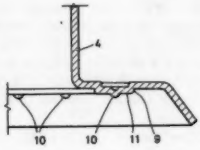


1. A device for carrying and closing bags, for example refuse bags, comprising a flat carrier ring, a plurality of fingers integrally formed with the carrier ring and defining a conical body member, a wide passage in the center of the conical body member for the insertion of the mouth of the bag, a plurality of slots each extending intermediate each two adjacent fingers from the passage towards the carrier ring, said slots terminating at a distance from the passage towards the carrier ring, wherein each of said fingers is provided with two prongs separated but a short slot, the carrier ring and fingers being made of a relatively rigid plastic material, and wherein the carrier ring is thicker than the fingers.

4,697,313
TACK BUTTON

Koji Otsuka, Kitamoto, Japan, assignor to Scovill Japan Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1986, Ser. No. 848,884
Claims priority, application Japan, Apr. 30, 1985, 60-63180[U]
Int. Cl.[4] A44B *1/42*
U.S. Cl. 24—95 3 Claims

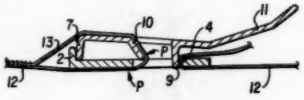


1. A button body of a tack button comprising a back member having a peripheral edge, a front member having a peripheral edge directly secured to and in contact with the peripheral edge of the back member, and a backing core fitted securely in a space formed between the two members, said back member having a continuous annular reinforcing groove portion forming a complete circle having an annular bottom surface facing the core and a plurality of projections formed on the bottom surface and held elastically in contact with said core.

4,697,314
CLAMP FOR HOLDING ROPE FAST

Gerth Ohman, Kramfors, Sweden, assignor to Ergonomen HB, Domsjo, Sweden

Filed Jan. 30, 1984, Ser. No. 575,139
Claims priority, application Sweden, Jan. 28, 1983, 8300479; Nov. 7, 1983, 8306074
Int. Cl.[4] B65D *63/00*
U.S. Cl. 24—132 R 2 Claims



1. A clamp for securely holding rope, cable and similar material in a fixed position, comprising:

(a) first and second clamping members of which at least one is movable towards and away from the other between clamping and releasing positions in a swinging movement about a pivot point;

(b) the first clamping member having a first opening for reception of a length of rope material and having side walls on opposite sides thereof;

(c) the second clamping member having a second opening in alignment with the first opening in both the clamping and releasing positions for reception both of the length of rope material and also a loop of the rope material to be clamped in a fixed position;

(d) each of the first and second openings having side walls on opposite sides thereof;

(e) the length of rope material engaging the side wall on the same side of the opening in the first clamping member; and the loop of rope material engaging the side walls of the

first and second openings on the sides opposite the side walls engaging the length;

(f) the second clamping member having a clamping extension projecting into the first opening through the first clamping member when the first and second clamping members are in the clamping position, and spaced away from the opening when the members are in the releasing position;

(g) the extension when the first clamping member is in the clamping position being spaced from the side wall of the opening engaging the length of rope material a distance sufficient to engage and clamp the length in a fixed position between the extension and the side wall;

(h) the first clamping member being shaped at one end so as to define a pivot support and the second clamping member being shaped at one end so as to define a pivot movable in the support so as to swing the other end thereof including the clamping extension between the clamping and releasing positions; and

(i) the loop being looped through the first and second openings about the pivot point of the first and second clamping members at the pivot support and via the first and second openings so as to hold the members together, the loop of rope material being the sole attachment holding the first and second clamping members together and being movable between loose and taut positions, so as when loose to permit swinging movement of the first member and disengagement of the rope material being clamped and when taut to hold the first member and second members in the clamping position, and prevent disengagement thereof so as to securely hold the rope material in a fixed position.

4,697,315

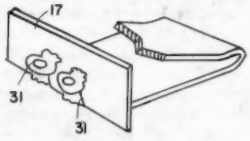
REINFORCED JEWELRY CLASP

Simon Geldwerth, Brooklyn, N.Y., assignor to Do-All Jewelry Mfg. Co., Inc., Springfield, N.J.

Filed Jan. 2, 1985, Ser. No. 688,324

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—616 **14 Claims**



1. A jewelry clasp comprising a male clasp member and a female clasp member which together form a separable clasp, one of said members comprising an upstanding wall and a base which form an angled portion, said angled portion being subject to stress as a result of the weight of the jewelry to which said jewelry clasp is attached, wherein said clasp further comprises at least one reinforcement rib stamped in said angled portion, thereby increasing the tensile strength of said angled portion, and wherein said upstanding wall is soldered to the jewelry, or to attachment means for attaching the jewelry to said clasp, at a position closely adjacent to said reinforcement rib, said solder at least partially filling the corresponding groove formed on the outside of said angled portion by said at least one reinforcement rib.

4,697,316

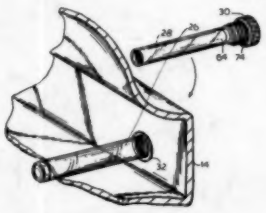
BURIAL CASKET WITH IDENTIFICATION CAPSULE

Joseph R. Semon, Eynon, Pa., assignor to Casket Shells, Inc., Eynon, Pa.

Filed Jul. 15, 1986, Ser. No. 885,924

Int. Cl.[4] A61G *17/00, 17/04*

U.S. Cl. 27—1 **1 Claim**



1. A burial casket comprising:

a plurality of walls cooperating to form a closed enclosure, one wall having a hole providing access into said enclosure

a capsule for holding information having a sleeve axially coextensive with and disposed within said hole; means for securing the sleeve to the said one wall, an outer tube extending away from said one wall and into said enclosure, said outer tube having a closed end and an open end, said open end adapted to open into said sleeve; means for securing outer tube to the sleeve, and an inner tube having a closed end and an open end disposed substantially within said outer tube; a cap secured to said inner tube and extending over the inner tube open end; said sleeve being at least partially internally threaded to define sleeve threads and said outer tube being provided with threads at said open end for engaging said sleeve threads; said cap being provided with outer threads for engaging said sleeve threads; said inner tube being provided with threads at said open end and said cap being provided with inner threads for engaging said inner tube threads to seal said inner tube; and said cap being arranged to seal both said outer and inner tubes.

4,697,317

PROCESS FOR THE PRODUCTION OF TWIST-FREE NOVELTY NUB YARNS

Thomas L. Nelson, Georgetown, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 4, 1985, Ser. No. 804,408

Int. Cl.[4] D02G *1/16*; D02J *1/06*

U.S. Cl. 28—258 **5 Claims**

1. A process for the production of a twist-free novelty nub yarn comprising the steps of:

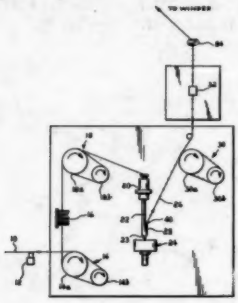
(a) feeding a substantially entanglement free multifilament crimped continuous yarn through a forwarding jet having a flow of air therethrough;

(b) feeding the yarn as a loop concurrently with said flow of air into the entrance of an entanglement jet, having a jet tube aligned with the entrance of the entanglement jet, wherein substantially only the arch portion of the loop enters the entanglement jet tube;

(c) passing the yarn through highly turbulent gas within the entanglement jet, wherein the entanglement jet is substantially aligned with the forwarding jet to increase the turbulence in the entanglement jet by feeding the air out of the forwarding jet into the entanglement jet, wherein the distance from the forwarding jet exit to the entanglement

jet tube inlet is greater than about 0.2 inches and less than about 0.6 inches;

(d) entangling the yarn, forming nubs; and



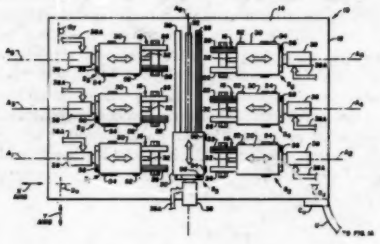
(e) pulling the yarn countercurrently; with said flow of air out of the entanglement jet.

4,697,318

ADAPTABLE MACHINING SYSTEM

John L. Wickham, Glenarm; Jeffrey D. Fox, Joppatowne, and Ross C. Miller, Millers, all of Md., assignors to The J. L. Wickham Company, Incorporated, Baltimore, Md.

Filed Nov. 26, 1985, Ser. No. 801,845
Int. Cl.[4] B23Q *37/00*
U.S. Cl. 29—33 P **30 Claims**



1. An adaptable machining system comprising:

a machine base having a plurality of defined workstation positions to which respective workstations may be secured and means defining a multi-axis reference system; and

a workstation secured to each of said workstation positions, each of said workstations including a transport unit having a stationary member secured to a workstation position and a module-receiving member mounted for movement relative to said stationary member to and from a workpiece machining position, said module-receiving member of each transport unit establishing a multi-axis coordinate system relative to the multi-axis reference system of said machine base; a tool module for mounting upon respective module-receiving members of each transport unit and including a tool and means for driving said tool, each of said tool modules having an interface member for cooperatively engaging its respective module-receiving member to dimensionally define the position of said tool module relative to the multi-axis coordinate system of the respective module-receiving member and the multi-axis reference system of said machine base,

wherein said module-receiving members further comprise surface means for defining respective first, second, and third coordinate defining surfaces for the respective interface member, and

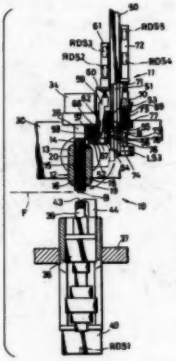
wherein said interface members further comprise first, second, and third surfaces for engaging said first, second, and third coordinate defining surfaces of said module-receiving member.

4,697,319

APPARATUS FOR ATTACHING BOXES TO SLIDE FASTENERS WITH SEPARABLE BOX AND PIN OF SYNTHETIC RESIN

Mitsugu Umino, Uozu, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Continuation of Ser. No. 734,613, May 16, 1985. This application Aug. 29, 1986, Ser. No. 902,112
Claims priority, application Japan, May 18, 1984, 59-99827
Int. Cl.[4] A41H *37/06*; B29D *5/00*; B23Q *7/10*
U.S. Cl. 29—33.2 **2 Claims**



1. An apparatus for attaching a box of synthetic resin to a box pin on an end of a slide fastener chain, comprising:

(a) a frame;

(b) a box feed mechanism supported on said frame, and having a chute for storing a succession of boxes;

(c) a box holder swingably mounted on said frame, and angularly movable between a box receiving position in registration with said chute, and a box attaching position, said box holder having a casing, a slide block slidably disposed in said casing, an anvil slidably disposed in said casing, a pair of gripping jaws pivotally mounted on said slide block and angularly movably disposed in said casing for gripping the box therebetween against an end of said anvil, a guide plate mounted in said casing for guiding sliding movement of said slide block, said slide block having a pair of arms extending away from each other, and a pair of springs acting between said arms and said gripping jaws for normally urging said gripping jaws toward each other;

(d) first means for pressing said anvil in said box attaching position and providing spring-biased clearance permitting lateral insertion of an over-sized box-expanding pin into said box;

(e) an ultrasonic horn mounted for movement toward and away from said box holder and said anvil

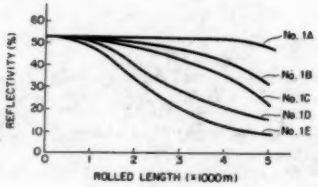
(f) second means for pressing said ultrasonic horn toward said anvil holder in said box attaching position to grip the box between said end of said anvil and said ultrasonic horn.

4,697,320

ROLL FOR A ROLLING MILL, METHOD OF PRODUCING THE SAME AND THE ROLLING MILL INCORPORATING THE ROLL

Joo Ishihara, Hitachi; Toshio Ogawa; Masashi Era, both of Katsuta, and Ken-ichi Sato, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 28, 1984, Ser. No. 625,591
Int. Cl.[4] B31B *31/08*
U.S. Cl. 29—132 20 Claims



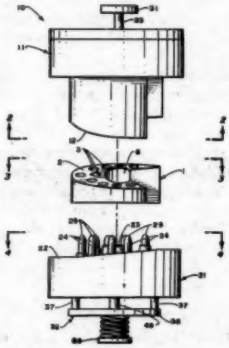
1. A roll for a rolling mill comprising a barrel including a barrel surface made of steel containing carbide dispersed in a matrix having a martensite structure, characterized in that a mean grain size of said carbide is not greater than 0.6 μm, and an areal ratio of said carbide in the matrix lies in a range of 6-30%.

4,697,321

METHOD OF MANUFACTURING BAFFLES FOR SHELL AND TUBE TYPE HEAT EXCHANGERS

Hisao Shibuya, Kunitachi, and Tsunero Yusa, Chiba, both of Japan, assignors to Kamui Company Ltd., Japan

Division of Ser. No. 761,380, Jul. 31, 1985, Pat. No. 4,614,105.
This application Apr. 14, 1986, Ser. No. 851,238
Int. Cl.[4] B21D *53/00*; B23P *15/26*
U.S. Cl. 29—157.3 R 8 Claims



1. A method of forming a baffle section for a shell and tube type heat exchanger comprising the steps of:

stamp forming a circular plate having less than a full circumference and containing a pattern of apertures corresponding to a heat exchange tube pattern by pressing the plate between two forming dies having opposed, helically shaped, mating surfaces to form a helically-shaped baffle section; and

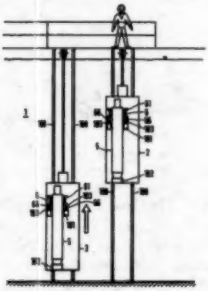
reaming said apertures to form a lip thereon.

4,697,322

METHOD AND DEVICE FOR REPAIRING FUEL ASSEMBLIES OF BOILING-WATER NUCLEAR REACTORS

Klaus Knecht, Erlangen, and Kurt Kraus, Hemhofen, both of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 226,940, Jan. 21, 1981, abandoned. This application Oct. 18, 1983, Ser. No. 543,081
Int. Cl.[4] B23P *19/04*; G21C *17/00, 19/00*
U.S. Cl. 29—402.03 5 Claims



1. Method of repairing under water by means of a channel stripping machine, a boiling water reactor-fuel assembly having a fuel assembly channel and an upper grid plate by disassembling the upper grid plate, determining a damaged fuel rod and exchanging the damaged fuel rod for another fuel rod by means of a fuel rod exchanging device, the method comprising first stripping off the fuel assembly channel, then disassembling the upper grid plate at the location thereof in the channel stripping machine, next placing on the fuel assembly a guide box with which the fuel rods of the fuel assembly are centered, then placing thereon an indicator plate and determining the varying growth of the fuel rods, and thereafter replacing the indicator plate by a centering plate to which the fuel rod-exchanging device is coupled.

2. Device for performing a method of repairing under water a boiling water reactor-fuel assembly having a fuel assembly channel and an upper grid plate by means of a channel stripping machine, said device comprising a guide box disposable on the fuel rods for centering the fuel rods, after the grid plate has been disassembled in order to determine and exchange a damaged fuel rod for another fuel rod, an indicator plate disposable on said guide box for determining varying growth of the fuel rods, and a centering plate having a fuel rod changing device coupled thereto, said indicator plate being replaceable by said centering plate.

4,697,323

TOOL FOR ARCHERY BOW CUSHION PLUNGER AND FOR ARROW NOCKS

Guy Sauvageau, 12064 L'Acadie Blvd., Montreal, Canada (H3M 2T9), and Marcel Sauvageau, 16,125 Demers Street, St-Hyacinthe, Canada J2T 3V4

Filed Mar. 3, 1986, Ser. No. 835,872
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—264 8 Claims

1. For use with an archery bow conventional cushion plunger having a head, a locking tool adapted to facilitate removal of the head; said cushion plunger including an externally-threaded hollow dowel having a stepped bore defining a large diameter rear bore portion and a smaller diameter front portion with a rearwardly-facing step defining the junction of said two bore portions, a plunger slidable in said rear bore portion, a plunger shaft rigidly attached to the front end of said

plunger slidable in said front bore portion, and extending outwardly of the front end of said dowel; said head being screwed to the front end of said plunger shaft; further including a closure cap screwed on the rear end of said dowel and biasing means extending between said plunger and closure cap within said rear bore portion; said tool comprising a cylindrical member having a closed rear end and formed with an internally-threaded bore beginning at its open front end and extending along a major portion thereof; said internally-threaded bore being adapted to screw onto the externally-threaded dowel at the rear portion of the dowel; the bore of said cylindrical member having extending therethrough a rigid rod element

rigidly secured to said closed rear end coaxial with said cylindrical member and projecting outwardly of said front end of the cylindrical member a predetermined distance, whereby removing said closure cap and biasing means and screwing said cylindrical member in its place forces said rod free end against the rear face of said plunger to immobilize the latter against said step thereby allowing the head to be rotated relative to said plunger shaft, said cylindrical member further defining a rear axial cylindrical extension provided with at least one bore shaped to receive an arrow nock with flattened sides, whereby the tool can also be used as a key to rotate the nock relative to an arrow butt.

4,697,324

FILAMENTARY STRUCTURAL MODULE FOR COMPOSITES

William F. Grant, Londonderry, N.H.; Gary W. Burt, Methuen, and Albert J. Kumnick, Acton, both of Mass., assignors to Avco Corporation, Lowell, Mass.

Filed Dec. 6, 1984, Ser. No. 678,847
Int. Cl.[4] B23K *20/22*; B32B *15/14*
U.S. Cl. 29—419 R **12 Claims**

1. A planar filamentary structural module for composites comprising:

a monolayer of at least one spaced-apart continuous filament wound in a planar spiral about an axis, adjacent filament positions being separated by intended matrix material situated substantially between said continuous filaments.

12. A process for making a filamentary reinforced aperture within unidirectional filamentary reinforced material comprising the steps of:

providing a plurality of layers of unidirectional filamentary reinforced material containing a first aperture;

interposing between adjacent layers of said unidirectional material a module comprising a layer of a continuous filament wound in a planar spiral ring, said ring having a second aperture which conforms to said first aperture, said first and second apertures being aligned one above the other; and

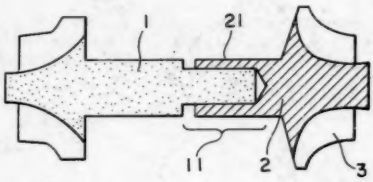
consolidating said unidirectional material and said modules into a unitary structure.

4,697,325

METHOD FOR JOINING CERAMIC PARTS TO METALLIC PARTS

Osami Kamigaito; Haruo Doi, and Shoji Noda, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Continuation of Ser. No. 772,410, Sep. 4, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 5,396
Claims priority, application Japan, Nov. 5, 1984, 59-233853
Int. Cl.[4] B23P *11/02*
U.S. Cl. 29—447 **13 Claims**



1. A method for producing a jointed article composed of a ceramic article and a metallic article, said ceramic article being selected from the group consisting of aluminum oxide (Al_2O_3), zirconium oxide (ZrO_2), silicon nitride (Si_3N_4), and silicon carbide (SiC), which comprises the steps of:

forming a metallic film on the surface of said ceramic article over a joining part and a part adjacent to the joining part where tensile stresses are formed as the result of the subsequent joining step, said metallic film being formed of at least one metal selected from the group consisting of Ti, Zr, Hf, V, Nb, Cr, Ni and Co, and having a thickness of 0.1 to 0.5 μm;

irradiating the surface of said metallic film with high-energy ions causing mixture of atoms between said metallic film and said ceramic article so as to fast adhere said metallic film and said ceramic article; and

joining said ceramic article to said metallic article through said metallic film held between said ceramic article and said metallic article so as to produce said jointed article composed of both articles fixedly fitted under pressure, thereby preventing the breakage of said ceramic surface near the end of said metallic article.

4,697,326

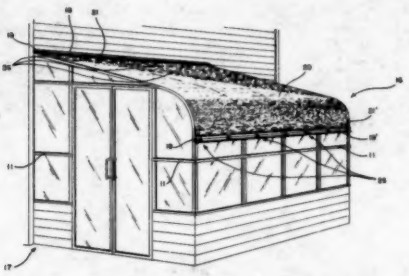
SCREEN MEANS

F. Craige Faircloth, 4701-C Hollowell La., Raleigh, N.C.

Filed May 28, 1985, Ser. No. 738,239
Int. Cl.[4] B23P *11/02*; A47G *5/00*
U.S. Cl. 29—448 **6 Claims**

1. The method of providing a taut, wrinkle free covering juxtaposed to a pre-determined area of a structure having a plurality of vertically extending support member comprising: securing an angle bar means having a plurality of closely spaced cam lock means mounted thereon to said vertically extending support members on opposite sides of said area; attaching screen bar means to a screen type cover means on opposite edges thereof; connectingly engaging said cam lock

means with said screen bar means; disposing said cover means over said area; and tightening said cam lock means to pull said



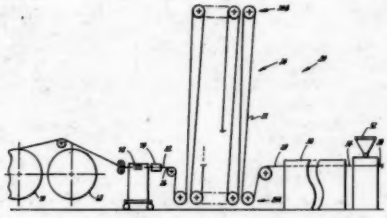
screen bar means towards said angle bar means whereby a taut, wrinkle free covering is provided over said area.

4,697,327

PAINTED INSULATED METAL EDGE GUARD AND METHOD

Robert Adell, Sunnyvale, Tex., assignor to U.S. Product Development Company, Sunnyvale, Tex.

Filed Mar. 13, 1986, Ser. No. 839,744
Int. Cl.[4] B23P *17/04*
U.S. Cl. 29—527.4 20 Claims



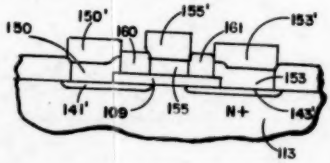
1. A process for making a decorative and protective painted insulated metal edge guard of generally U-shaped cross section which fits onto the trailing edge of a swinging closure wherein at least a portion of the exterior surface of the U-shaped cross section which is visible when the edge guard is installed on the trailing edge of the swinging closure is covered by material which is color coordinated with the color of the swinging closure, said process comprising extruding by means of an extruder a layer of a non-metallic insulating material onto a metal strip which is pulled through the extruder along a straight line, painting the strip selectively one color after another, then after the strip has been pulled through the extruder and painted, forming the now-painted and now-insulated strip into a succession of individual coils, each of which has been painted with a paritcular color, by coiling the strip after it has been pulled through the extruder and painted, and severing the strip between different paint colors, then taking one of said coils containing painted insualted strip of desired paint color for color-coordination with a particular colored swinging closure, uncoiling the strip from said one coil and passing the uncoiled strip through a roll-forming apparatus to form the painted insulated strip into a U-shaped cross section for fitting onto the trailing edge of the swinging closure and wherein the exutrder so extrudes the layer of insulating material onto the metal strip and the roll-forming apparatus so forms the strip into the U-shaped cross section that at least some of said insulating material is disposed on the interior of the strip so as to protectively insulate the metal of the strip from the the trailing edge of the swinging closure when the edge guard is installed on the trailing edge of the swinging closure, and that at least some of the paint is disposed on the exterior of the strip so as to be visible when the guard is installed on the trailing edge of the swinging closure.

4,697,328

METHOD OF MAKING HARDENED NMOS SUB-MICRON FIELD EFFECT TRANSISTORS

Frank Z. Custode, Norco, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 28, 1986, Ser. No. 856,302
Int. Cl.[4] H01L *21/385, 21/425*
U.S. Cl. 437—41 6 Claims



1. A process for producing NMOS submicron devices on a P-doped silicon wafer, comprising the steps of:

delineating active regions on the wafer, each region comprising a gate oxide layer having source and drain openings, an N-doped polysilicon layer over the gate oxide layer and openings, and a silicon nitride layer over the N doped polysilicon layer;

removing the nitride layer and at least a portion of the N-doped polysilicon layer outside of the active region;

implanting boron ion field implant guard around each active region;

thermally oxidizing the polysilicon layer to form the field oxide around the active region and dope the wafer via the source and drain regions to outline a source and a drain for each device;

using a gate-contact mask to open the nitride layer and remove some polysilicon on opposite sides of a channel region formed thereby;

implanting phosphorus ions into the wafer via the opened nitride layer to extend said source and drain to the opposite sides of the channel;

growing cross-over oxide where the nitride and polysilicon were removed;

removing the nitride layer over the polysilicon covering the source, drain and gate and serving as electrodes for the source, drain and gate; and,

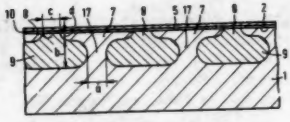
depositing and delineating metal interconnects at least over the source, drain and gate electrodes.

4,697,329

METHOD OF MANUFACTURING AN ANTIBLOOMING IMAGE SENSOR DEVICE

Arnoldus J. J. Boudewijns, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Division of Ser. No. 671,154, Nov. 13, 1984, Pat. No. 4,654,682.
This application Nov. 14, 1986, Ser. No. 930,985
Claims priority, application Netherlands, Nov. 24, 1983, 8304035
Int. Cl.[4] H01L 27/00, 29/00, 31/00
U.S. Cl. 437—2 2 Claims



1. A method of manufacturing an image sensor device, said method comprising the steps of:

providing a semiconductor substrate having a conductivity of a first type, having a top surface, and having a first dopant concentration;

providing a first mask on the top surface of the substrate, said first mask having a number of windows extending in a longitudutinal direction, said windows having a constant center-to-center spacing;

diffusing impurities into the substrate via the windows in the first mask to form zones of a second conductivity type opposite the first conductivity type, said zones having a second dopant concentration greater than the dopant concentration of the substrate and extending into the substrate a first depth, the depth varying in a direction perpendicular to the longitudinal direction with the depth having maxima beneath the center lines of the zones of the second conductivity type;

removing the first mask;

providing a second mask on the top surface of the substrate, said second mask having a number of windows extending in the longitudinal direction, said windows having a constant center-to-center spacing equal to the center-to-center spacing of the windows in the first mask, the windows in the second mask being centered between the zones of the second conductivity type;

diffusing impurities into the substrate via the windows in the second mask to form a number of channel regions in the substrate, said channel regions adjoining the top surface of the substrate, said channel regions extending in a longitudinal direction parallel to the top surface, said channel regions having a conductivity of a first type, said channel regions having a third dopant concentration which is greater than the dopant concentration of the zones of the second conductivity type, said channel regions extending into the substrate a second depth which is less than the depth of the zones of the second conductivity type;

removing the second mask; and

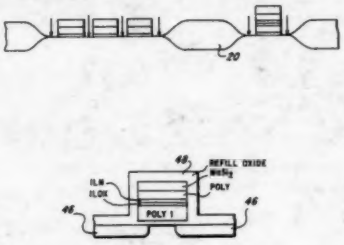
providing a system of electrodes above the top surface of the substrate, said electrodes extending perpendicular to the longitudinal direction and parallel to the top surface.

4,697,330

FLOATING GATE MEMORY PROCESS WITH IMPROVED DIELECTRIC

James L. Paterson, and Boger A. Haken, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 469,075, Feb. 23, 1983, Pat. No. 4,613,956.
This application May 27, 1986, Ser. No. 867,178
Int. Cl.[4] H01L 21/425
U.S. Cl. 437—42 45 Claims



1. A method for making a floating gate memory, comprising the steps of:

providing a substrate having a semiconductor surface portion;

forming a first gate insulator layer on said substrate;

forming a first insulated conductor layer over said substrate, said conductor layer being polycrystalline and comprising silicon;

forming a layer of silicon dioxide over said first conductive layer;

forming a layer of silicon nitride over said first conductive layer;

patterning said first insulated conductor layer, to define a plurality of desired floating gates;

providing an oxidizing atmosphere to form gate insulators in selected locations;

forming a second conductive layer in predetermined locations, said second conductive layer comprising control gate portions over said floating gates in said first conductive layer; and

implanting a plurality of source/drain regions on opposite sides of the respective ones of said floating gates;

whereby a floating gate memory cell having very high specific capacitance between said respective floating gates and said respective control gates is formed.

4,697,331

METHOD OF FABRICATION OF A CONTROL TRANSISTOR FOR A FLAT-PANEL DISPLAY SCREEN

Francois Boulitrop, Sceaux; Eric Chartier, Chatenay Mallabry; Bruno Mourey, Boulogne Billancourt, and Serge Le Berre, Dampierre, all of France, assignors to Thomson-CSF, Paris, France

Filed Aug. 25, 1986, Ser. No. 900,079
Claims priority, application France, Aug. 27, 1985, 85 12804
Int. Cl.[4] H01L 21/18, 29/78; G09G 3/36
U.S. Cl. 437—82 6 Claims

1. A method of fabrication of a control transistor for a flat-panel display screen placed on a substrate, comprising the following successive steps:

(a) a first step which involves deposition of conductive material on the substrate;

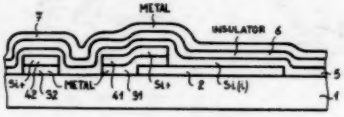
(b) a second step which involves etch cutting of at least one control electrode in the layer of conductive material;

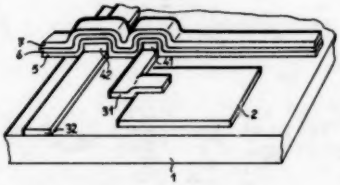
(c) a third step involving deposition of a first layer of metallic material;

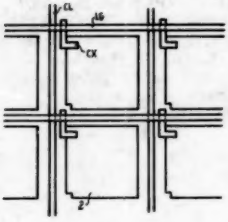
(d) a fourth step involving deposition of an n-type doped amorphous semiconductor layer;

(e) a fifth step which involves etch cutting of at least one connecting element having a portion in contact with the electrode and of a column located in proximity to said connecting element in the layers of n-type doped amorphous semiconductor material and of metallic material deposited earlier;

(f) a sixth step involving deposition of a layer of undoped amorphous semiconductor material;







(g) a seventh step involving deposition of a layer of insulating material;

(h) an eighth step involving deposition of a second layer of metallic material;

(i) a ninth step which involves etch cutting of at least one row which overlaps the column and the connecting element in the layers of metallic material, of insulating material and of undoped amorphous semiconductor material.

4,697,332

METHOD OF MAKING TRI-WELL CMOS BY SELF-ALIGNED PROCESS

Richard C. Joy, Los Gatos, and Tarsaim L. Batra, Cupertino, both of Calif., assignors to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 614,418, May 25, 1984, abandoned. This application Sep. 20, 1985, Ser. No. 779,388

Int. Cl.[4] H01L *21/22, 7/54, 21/263*

U.S. Cl. 437—29 **15 Claims**

1. A method of forming wells in a semiconductor substrate comprising:

depositing a thin layer of oxide on said substrate,

depositing a layer of silicon nitride on said thin layer of oxide,

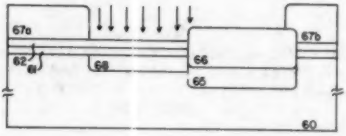
initiating a process to be repeated at least two times in the stated order of:

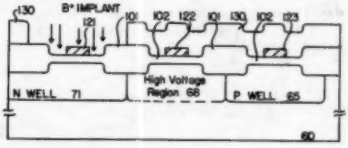
applying a layer of photoresist,

removing portions of said photoresist, thereby exposing portions of said silicon nitride,

removing exposed portions of said silicon nitride and thin oxide, thus creating exposed portions of said semiconductor substrate,

implanting dopants of a selected conductivity type to a selected concentration into said exposed portions of said semiconductor substrate, thereby forming a well of said selected conductivity type having a breakdown voltage determined by said selected concentration,





oxidizing said exposed portions of semiconductor substrate thus creating protective thick oxide over said exposed portions and diffusing said dopants into said semiconductor substrate,

and after sufficient repetition of said process, when the desired number of regions have been formed, removing said protective thick oxide.

4,697,333

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE USING AMORPHOUS SILICON AS A MASK

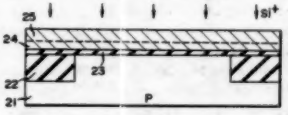
Moriya Nakahara, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

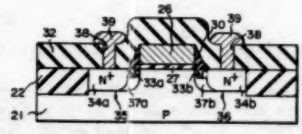
Filed Feb. 19, 1986, Ser. No. 830,831

Claims priority, application Japan, Feb. 20, 1985, 60-30508

Int. Cl.[4] H01L *21/265, 21/308*

U.S. Cl. 437—20 **5 Claims**





1. A method of manufacturing a semiconductor device, comprising the steps of:

forming an insulating film on a semiconductor substrate;

forming a polycrystalline silicon layer on said insulating film;

converting all of said polycrystalline silicon layer, or a portion of said polycrystalline silicon layer of a predetermined thickness, into an amorphous silicon layer;

forming a patterned layer by patterning said polycrystalline silicon layer, either all of which or a portion of which of a predetermined thickness, has been converted into an amorphous silicon layer; and

ion-implanting an impurity in said semiconductor substrate using said patterned layer as a mask.

4,697,334

METHOD OF PRODUCING ELECTROACOUSTIC CONVERTERS, PREFERABLY MICROPHONES, AND CONVERTERS PRODUCED ACCORDING TO THE METHOD

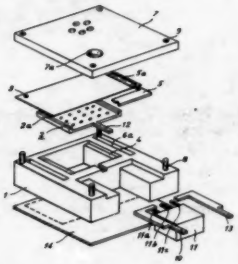
Henning S. Madsen; Tommy S. Sergerö, and Karl A. Johansson, all of Tyresö , Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Dec. 21, 1984, Ser. No. 684,594

Claims priority, application Sweden, Dec. 22, 1983, 8307124

Int. Cl.[4] H04R *31/00, 1/02, 7/00, 19/00*

U.S. Cl. 29—594 **6 Claims**



1. A method of producing an electroacoustic converter with a closed resonance chamber, said method comprising placing the underside of a frame having a hollow annular region on a strip of deformable, plastic material which extends beyond the frame, sealingly attaching the strip to the frame around said hollow annular region, securing a diaphragm to the top of the frame to form a resonance chamber in the hollow annular region bounded on the bottom by the strip and on the top by the diaphragm, providing an electrical connection to the diaphragm, measuring sensitivity of the converter and permanently deforming said strip within the resonance chamber to vary the volume of said resonance chamber to adjust the sensitivity of the converter to a predetermined value and separating said converter from the strip outside the region where the strip and frame are sealingly attached.

4,697,335

METHOD OF MANUFACTURING A FILM-TYPE ELECTRONIC DEVICE

David Pedersen, Spring Grove, and Vincent N. Cupidro, Arlington Heights, both of Ill., assignors to Hy-Meg Corporation, Addison, Ill.

Filed Mar. 31, 1986, Ser. No. 846,105

Int. Cl.[4] H01C *17/06*

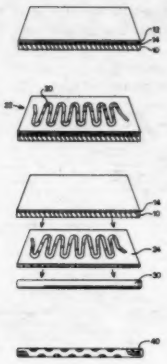
U.S. Cl. 29—620 **7 Claims**

1. A method of manufacturing a film-type electronic device comprising:

a. attaching a water soluble layer to a rigid reinforcing base,

b. applying a pattern of film having electrical properties to said soluble layer, and

c. drying said pattern of film while maintaining said soluble layer in attachment with said base;



d. applying a water insoluble top layer in adhering overlying relation to said pattern of film to provide support thereto.

4,697,336

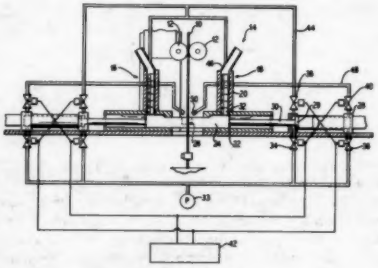
AIR DISCHARGE SYSTEM FOR USE WITH CONNECTOR APPLYING MACHINES

Charles E. Shields, 655 Woodland, Crystal Lake, Ill. 60014

Filed Jul. 25, 1986, Ser. No. 889,399

Int. Cl.[4] H01R *43/04*

U.S. Cl. 29—753 **5 Claims**



1. An apparatus for applying electrical connector sections to a flat multiconductor cable which includes supply means for supplying a multiconductor cable, a connector applying station for receiving said cable and applying an electrical connector, said station including two connector applying sections, each section having connector supply magazine means, tooling means for receiving a connector section and pneumatic cylinder means for advancing the tooling means to the cable for securement of the connector thereto and for retracting the tooling to a connector receiving position, wherein the improvement comprises at least one of said pneumatic cylinder means including a pair of outlet valve means, first air discharge line means extending between one of said valve means and a connector termination position and a second air discharge line means extending between the other of said outlet valve means and the magazine feed means for selectively discharging air into the magazine means as the tooling is extended toward the connector termination position and for discharging air toward the connector termination position as the tooling is retracted.

4,697,337

METHOD FOR MANUFACTURING THERMO-INSULATED COMPOUND PROFILES FOR WINDOWS, DOORS AND FACADES

Manfred Mühle, D-4972 Löhne 2, Fed. Rep. of Germany

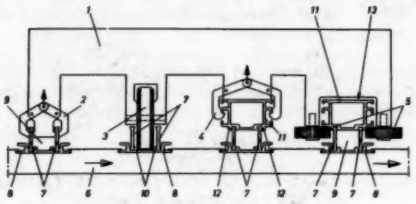
Division of Ser. No. 662,294, filed as PCT DE84/00019, Jan. 25, 1984, published as WO84/02862, Aug. 2, 1984, Pat. No. 4,646,416.

This application Sep. 29, 1986, Ser. No. 913,015

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1983, 3303094

Int. Cl.[4] B23P *19/00*; S21D *39/00*

U.S. Cl. 29—796 5 Claims



1. A device for manufacturing thermo-insulated compound profiles for windows, doors and facades, comprising: a production head; a double clamp in said production head for drawing in connecting webs; at least one forming roller projecting into an insulating chamber area of a compound profile and pressing against inner retaining strips of a first metal profile provided with connecting webs; a gripping clamp for slipping on a second metal profile and forming rollers located opposite one another in pairs at right angles to a profile access and acting from outside on said retaining strips to be pressed last; said double clamp, said one forming roller, and said gripping clamp being arranged next to one another in said production head in a predetermined sequence.

4,697,338

DEVICE FOR PREPARING A CUTTING TOOL

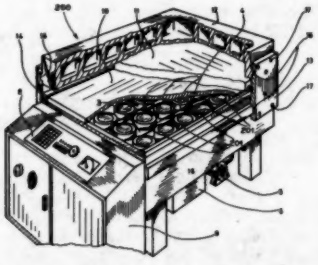
Werner Fuchs, Lausanne, and Jean-Claude Rebeaud, Le Mont, both of Switzerland, assignors to Bobst SA, Switzerland

Filed Aug. 29, 1985, Ser. No. 770,746

Claims priority, application Switzerland, Aug. 31, 1984, 4173/84

Int. Cl.[4] B23P *11/00*

U.S. Cl. 29—799 4 Claims



1. In a press for acting on a cutting tool for die cutting sheet material, said press having a lower bed, an upper bed, means for holding the upper and lower beds with a desired spacing therebetween, pressure applying means acting between the lower bed and a plate member to urge the plate member towards the upper bed and means for actuating the pressure applying means the improvement comprising the pressure applying means comprising a plurality of individual pressure elements being arranged in rows and columns on the lower bed to form a rectangular configuration with four corners, a pushing plate resting on all the pressure elements, and wherein the means for actuating the pressure applying means including a pump for creating fluid under low pressure and a fluid distribution arrangement including low pressure lines extending to the pressure elements disposed in each of the corners of the rectangular configuration and a high pressure fluid system including valves to enable selectively applying high pressure to the pressure elements.

4,697,339

METHOD FOR THE PROCESSING OF A CABLE END AND CABLE CONNECTOR FOR CONNECTION TO THE CABLE

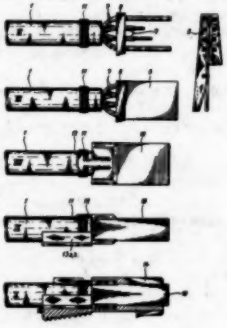
Laurentius M. Verhoeven, Veghel, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 7, 1986, Ser. No. 837,390

Claims priority, application Netherlands, Mar. 26, 1985, 8500885

Int. Cl.[4] H01R *23/06*

U.S. Cl. 29—828 7 Claims



1. A method for the processing of the end of a screened, multicore round cable having an outer sheath and the connection of said cable end to a connector comprising the steps of

a. cutting into the outer sheath all round down to the metallic screen along two circumferential lines spaced apart so that to form an auxiliary sheath tube therebetween, and also to form an end sheath tube towards the end of the cable;

b. sliding the end sheath tube aside for a distance and then sliding it back again with the screening so that said screening bunches up, subsequently cutting off of the screening, and removing of the end sheath tube and the severed screening;

c. sliding the auxiliary sheath tube aside over the edge of the cut-off screening and sliding it back again along with the screening so that said screening bunches up, and subsequent folding of the screening all round over the auxiliary sheath tube; and

d. stripping the insulation from the separate conductors, connecting the conductors to an insulated contact block of the connector, and contacting a ground terminal of the connector to the folded-over screening.

4,697,340
METHOD OF MANUFACTURING A CARRIER ASSEMBLY

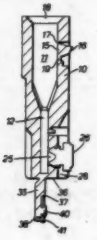
James E. Finney, Aldershot, England, and Weldon L. Brubaker, Lisle, Ill., assignors to Molex Incorporated, Lisle, Ill.

Division of Ser. No. 613,949, May 25, 1984. This application Oct. 21, 1985, Ser. No. 789,680

Claims priority, application United Kingdom, Jun. 3, 1983, 8315211

Int. Cl.[4] H01R *43/04*; B21D *39/00*; B23P *11/00*; B29C *65/00*

U.S. Cl. 29—862 4 Claims



1. A method for manufacturing a carrier assembly for molded ther.noplastic articles, said carrier assembly comprising a generally continuous carrier strip having a plurality of spaced-apart molded articles secured thereto in uniform orientation, said carrier strip being separate from said article and said carrier assembly being adapted to be coiled or reeled for shipment or in use, said method comprising the steps of:

(a) integrally molding each of said thermoplastic articles with a tag thereon, said tag including a projection extending therefrom;

(b) providing a separate generally continuous carrier strip adapted to be coiled or reeled;

(c) punching a plurality of spaced-apart holes in said carrier strip;

(d) locating each projection through a corresponding hole in said carrier strip; and

(e) thereafter securing the projection to its corresponding hole by plastically deforming said projection onto said strip.

4. The method of claim 1 wherein said molded article is a connector housing made of insulating material which includes at least one terminal receiving cavity therein, said method further including mounting an electrical terminal in said cavity.

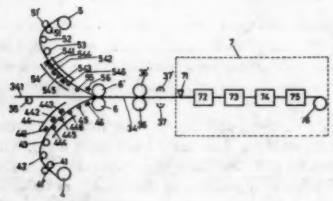
4,697,341
PROCESS TO MANUFACTURE CONTROL CABLE

Chien-Han Ho, P.O. Box 68-53, Taipei, Taiwan

Filed Mar. 18, 1986, Ser. No. 840,878

Int. Cl.[4] H01R *43/04*

U.S. Cl. 29—871 12 Claims



1. A process to manufacture control cable comprising the steps of:

(a) moving a plurality of conducting wires in parallel to a product collector, with a predetermined pitch between said wires;

(b) feeding films of plastic in parallel with said conducting wires, one film moving above the conductive wires and another film moving below said conducting wires, the films extending to the product collector;

(c) preheating the plastic films in a tunnel-type heater;

(d) heating the preheated plastic films, integrating the upper and lower plastic films around said conducting wires and forming a groove between each two consecutive conducting wires by pressing and cooling said films with forming rolls in order to form a flat ribbon cable;

(e) pulling said conducting wires by means of transmission rolls in order to reduce the load on the forming rolls;

(f) cutting the films between each two wires;

(g) twisting the flat ribbon cable;

(h) covering the twisted cable with metal foil;

(i) covering the metal foil with a wire braid;

(j) coating the wire braid with a polyvinylchloride layer; and

(k) collecting the cable at the product collector.

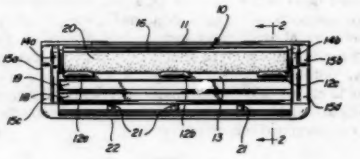
4,697,342
CAP FOR RAZOR BLADE ASSEMBLY ADAPTED TO RECEIVE AN EXTRA ELEMENT

Frank A. Ferraro, Trumbull, Conn., assignor to Warner Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 824,498, Jan. 31, 1986, Pat. No. 4,683,096. This application Jul. 21, 1986, Ser. No. 887,305

Int. Cl.[4] B26B *21/44*

U.S. Cl. 30—41 2 Claims



1. A substantially rectangular razor cap comprising:

(a) a substantially planar bottom surface;

(b) a top surface having;

(i) at least one unitary deformable narrow rear projection positioned parallel to and near the back of said top surface;

(ii) at least one unitary deformable narrow front projection positioned parallel to said rear projection; and

(c) a substantially rectangular lubricating strip positioned between said front and rear projections; said strip having a face-contacting planar surface forming an angle of not more than 30° from the bottom surface of said cap.

4,697,343
DEVICE FOR CUTTING SHIELDED CABLE

Scott J. Collins, Milwaukee, Wis., assignor to William E. Gardner, Slinger, Wis.

Filed Jul. 21, 1986, Ser. No. 887,199

Int. Cl.[4] B21F *13/00*

U.S. Cl. 30—90.3 4 Claims

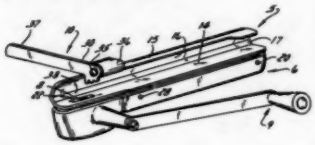
1. In a device for cutting the shielding of shielded cable, comprising an elongated cable carrier having a U-shaped cross-section defined by a pair of opposite side walls connected by a transverse wall and providing a groove that extends along the length of the cable carrier and into which a shielded cable can be laterally inserted, an elongated saw carrier connected with said cable carrier to extend lengthwise along one of said side walls thereof and to be laterally movable in opposite directions towards and from the cable carrier, and a saw blade having an arcuate cutting edge mounted on said saw carrier for

edgewise movement relative thereto and for movement therewith in said opposite directions whereby said cutting edge is carried into and out of said groove through a slit in said one side wall of the cable carrier, locking means whereby shielded cable can be readily releasably confined in said groove and immobilized relative to the cable carrier for cutting by the saw blade, said locking means comprising:

A. a lever pivoted to said cable carrier to swing about a lever axis which extends substantially parallel to the length of the cable carrier, is laterally spaced from said one side wall and said transverse wall and is near the other one of said side walls; and

B. a plurality of cable engaging lobes fixed on said lever,

(1) each said lobe projecting substantially radially in relation to said lever axis,



(2) each said lobe having a tip portion which is rounded about an axis of curvature that lies within the lobe and is parallel to said lever axis;

(3) said lobes being spaced apart angularly around the lever axis and being disposed in a single plane which is normal to the lever axis and transversely intersects said slit, and

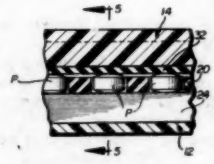
(4) said lobes having their tip portions at distances from the lever axis which increase progressively from lobe to lobe in one direction around the lever axis so that when the lobes are carried in that direction by swinging of the lever one of them will cammingly engage a shielded cable in said groove and force it into clamped engagement against said one side wall and said transverse wall.

4,697,344

PILL CUTTER

Norbert Leopoldi, Chicago, Ill., assignor to The Cloverline Incorporated, Chicago, Ill.

Filed May 23, 1986, Ser. No. 866,287
Int. Cl.[4] B25F *3/00*
U.S. Cl. 30—124 **2 Claims**



1. A pill cutter for simultaneously cutting a plurality of pills comprising:

a base member having a bottom wall and side walls, a resilient pad within said base member, a pluraity of pill receiving pockets in said pad, said pill receiving pockets being aligned in rows, a knife blade embedded within said pad and disposed with respect to said pill receiving pockets to cut pills disposed within said pockets aligned within a row when pressure is applied to said pill;

a top member having a top wall and side walls proportioned to receive therein said base member, a resilient pad within said top member, said resilient pad in said top member engaging said pills disposed within said pockets when said base member is received within said top member,

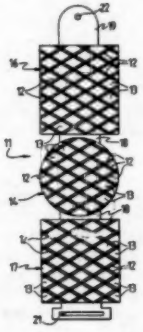
whereby said pills disposed within said pockets simultaneously are cut by said knife blade when said base and top members are pressed together.

4,697,345

APPARATUS FOR SEGMENTING EDIBLE PEELS OF FRUIT AND THE LIKE

Evie C. Cruce, 2647 Crossgate Trail, Montgomery, Ala. 36117

Filed Dec. 12, 1985, Ser. No. 808,285
Int. Cl.[4] B26B *3/00*
U.S. Cl. 30—315 **2 Claims**



1. An apparatus for segmenting the edible peel of a fruit and the like without removing the peel from said fruit comprising:

a flexible base member which may be urged into conformity with the surface of said fruit, said base member comprising an intermediate portion and two flanking portions, each said flanking portion being located on opposite sides of said intermediate portion and aligned on a common longitudinal axis, each portion of said base member supporting a plurality of discrete intersecting blades normal to a surface thereof and extending a distance sufficient to penetrate only said peel and defining a plurality of small interconnected enclosed areas, and

flexible coupling means connecting each said flanking portion to said intermediate portion.

4,697,346

YARN GAUGE

Tessa E. Warburg, The Old Vicarage, Godney, Wells, Somerset, BA51RX, England

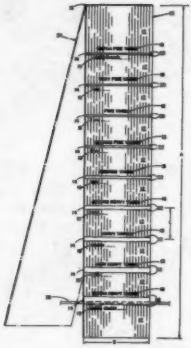
Filed Mar. 27, 1986, Ser. No. 844,704
Int. Cl.[4] G01B *5/08*
U.S. Cl. 33—1 BB **7 Claims**

1. A device for gauging the category to which a length of yarn belongs, comprising:

a sheet having

a plurality of opaque regions, and a plurality of elongated transparent regions delineated by said opaque regions, said transparent regions having different widths and contour

corresponding respectively to the thicknesses and character of yarns falling within different said categories,



whereby when said length of yarn is viewed through said transparent regions, its category can be gauged.

4,697,347

APPARATUS FOR DERIVING THREE-DIMENSIONAL QUANTITATIVE INFORMATION FROM AT LEAST ONE STEREOPAIR

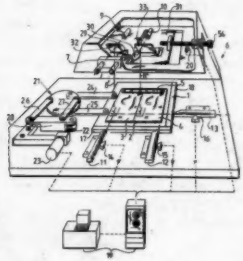
Frederik Goudswaard, Losser, Netherlands, assignor to 501 Stichting Internationaal Instituut Voor Lucht, Netherlands

Filed Jul. 2, 1986, Ser. No. 881,418

Claims priority, application Netherlands, Jul. 12, 1985, 8502014; Jun. 16, 1986, 8601552

Int. Cl.[4] G01C *11/08*

U.S. Cl. 33—1 A **12 Claims**



1. Apparatus for deriving three dimensional quantitative information of an object from at least one stereopair of photographs of said object, e.g. aerial photographs of the earth's surface, said apparatus comprising:

carrying means for carrying said photographs, said carrying means being movable with previously chosen degrees of freedom,

measuring means for determining the position coordinates and angular coordinates of said carrying means relative to a previously chosen coordinate system,

a stereoscopic observation system that is provided with an adjustable apparatus for determining the difference between the position coordinates of the corresponding pictures in the single photograph images of said stereopair, characterized in that

said carryirg means comprises only one flat carrying plate for carrying in one plane the stereopair of photographs, said carrying plate being freely shiftable in said plane relative to the measuring means and being adapted for maintaining in previously chosen fixed positions the related photographs relative to said carrying plate.

4,697,348

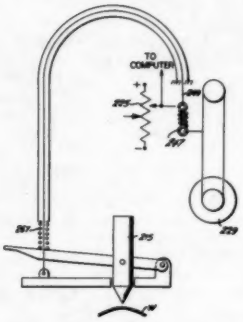
POSITIONING SYSTEMS

Christopher A. Parent, West Springfield, and James R. Voss, Wilbraham, both of Mass., assignors to United Innovations Division of United Engineers, Inc., Holyoke, Mass.

Continuation of Ser. No. 647,746, Sep. 6, 1984, Pat. No. 4,600,083. This application Jul. 14, 1986, Ser. No. 885,173

Int. Cl.[4] G01D *15/24;* **B43L** *15/00*

U.S. Cl. 33—18.1 **1 Claim**



1. An actuating mechanism for an inscribing stylus movable by a drive mechanism to a desired position relative to a work table and to a workpiece supported upwardly of the work table comprising in combination:

a housing,

a stepping motor mounted externally of the housing,

a drive shaft driven by the stepping motor,

a drive sprocket supported by the drive shaft,

a pair of coaxially aligned pulleys mounted relative to the housing vertically above and spaced from the drive sprocket,

a pair of bead chains entrained around the drive sprocket and each entrained around a respective one of the pulleys,

the first free ends of the bead chains being held fixed as to each other,

a J-shaped casing supported at a first extremity by and upwardly of the housing,

a bowden cable sleevably received within the casing,

an extension spring fixed at its lower extremity to the second free ends of the bead chains and at its upper extremity to one end of the bowden cable,

a cable guide sleeved around a second extremity of the casing,

a compression spring sleevably disposed within the cable guide and around the bowden cable,

a terminal crimp ring **269** engaging one end of the bowden cable,

a potentiometer enclosed within the housing and connected to the extension spring by a crimp ring,

the crimp ring and extension spring being slidable relative to the potentiometer,

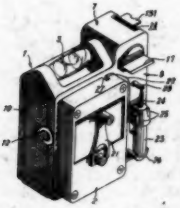
all adapted and arranged whereby compression of spring developes a force applicable through its linkage to the stylus as the stylus contacts the surface of the workpiece, downward vertical motion of the stylus is stopped and subsequent movement of the chains driven by the stepping motor is absorbed by the extension spring with the compression spring developing a force appliable to the stylus and the potentiometer sensing the workpiece and calibrating the spring force.

4,697,349

MULTI-FUNCTION MEASURING APPARATUS

Rule Lee, No. 34, Lane 697, Tunhwa S. Rd., Taipei, Taiwan, R.O.C., Taiwan

Filed Feb. 11, 1987, Ser. No. 13,897
Int. Cl.[4] G01B 3/10; G01C 15/10
U.S. Cl. 33—27.03 4 Claims



1. A multi-function measuring apparatus comprising:

(a) a housing substantially having the shape of a rectangular box, said housing comprising an upper face, a front face, a first side face and a second side face;

(b) a measuring tape stored in said housing, said measuring tape having a front portion of appropriate shape so as to be retained on an opening provided on said upper face of said housing;

(c) a level provided on said upper face of said housing;

(d) an ink box, with a locking handle, provided on said front face of said housing, said ink box comprising ink and an ink thread stored therein, the outermost end of said ink thread being attached to a needle grip having a needle thereon;

(e) a centering needle pivotally mounted to a fixing lug set on said first side face of said housing;

(f) a verticality-determination plate pivotally mounted between two retaining blocks provided on said first side face of said housing; and

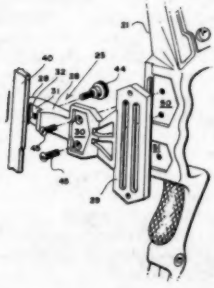
(g) a hook means pivotally provided on said second side face of said housing opposite to said first side face thereof.

4,697,350

COMBINATION ARROW QUIVER AND SIGHT SUPPORT MOUNT

Pete Shepley; Richard Johnston, and Allan F. Smith, all of Tucson, Ariz., assignors to Precision Shooting Equipment Company, Tucson, Ariz.

Filed Oct. 17, 1986, Ser. No. 920,034
Int. Cl.[4] F41B 5/00
U.S. Cl. 33—265 4 Claims



1. A combination quiver and sight mount for use on an archer's bow having a mount portion on the grip/handle/riser portion thereof between the two limbs, comprising,

a single unitary mounting bracket,

said mounting bracket having centrally thereof a bracket mounting segment,

a bow quiver bracket segment extending in one direction from said bracket mounting segment and secured to a quiver segment arm,

a removably secure and vertical adjustment means on the bracket engaging the quiver segment arm and permitting vertical adjustment of the arm,

a bow sight mounting bracket extending in the other direction and secured to a bow sight mounting arm,

a mounting shoe at the lower portion of the bracket mounting segment proportioned to engage the mount portion of the bow,

said combination mount being characterized by being symmetrical in plan view about its longitudinal axis substantially parallel with the flight of an arrow, and,

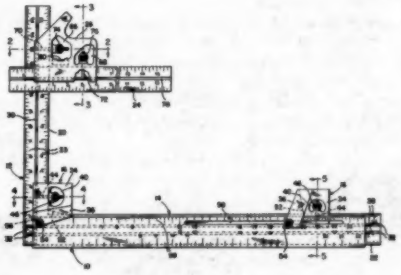
said quiver mounting bracket and said sight mounting bracket being offset substantially the same opposite directions from the mounting bracket segment, whereby the bow sight is mounted for positioning on one side of the archery bow handle riser portion, and means are provided for securing a bow quiver at the opposite side, thereby positioning both members in a substantially symmetrical and balanced fashion around the bow handle riser and handle of the bow.

4,697,351

ADJUSTABLE LAYOUT SQUARE

David M. Hopfer, 2876 Cloverdale Rd., Turner, Oreg. 97392

Filed Feb. 2, 1987, Ser. No. 9,740
Int. Cl.[4] B43L 7/06
U.S. Cl. 33—420 6 Claims



1. An adjustable square assembly comprising a framing square having elongate orthogonally disposed limbs, one of said limbs having one elongate groove centrally located between respective inner and outer edges of the limb, the other of said limbs being wider than said one limb and having a pair of elongate grooves located at distances from respective inner and outer edges of said other limb conforming to the distance of said one elongate groove from the inner and outer edges of said one limb, a pair of slide carriers for receipt on the respective limbs, the slide carriers each having a slot for sliding receipt on the respective limb and a clamping pin with a head extending into the slot for receipt in one of said grooves for releasably clamping the slide carrier in place on the respective limb, an elongate adjustable-angle blade, means providing a pivot connection between one end of the blade and one of said slide carriers and means providing a sliding connection between the other end of the blade and the other of said slide carriers whereby the angle of the blade is adjusted by movement of the slide carriers along the respective limbs of the framing square, the slide carriers being selectively mountable

on the respective limbs of the framing square for adjusting movement along the inner and outer edges thereof.

4,697,352

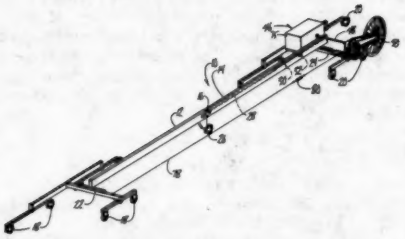
HIGHWAY PROFILE MEASURING DEVICE

Richard D. Angove, 200 Rockwell, Ames, Iowa 50010

Filed Jan. 28, 1987, Ser. No. 7,523

Int. Cl.[4] B61K *9/00*

U.S. Cl. 33—523 **20 Claims**



1. A surface profile measuring device, comprising:

an elongated first frame member having opposite forward and rearward ends;

an elongated second frame member having opposite forward and rearward ends;

hinge means pivotally connecting the frame members in an end-to-end relation;

front wheel means on the forward end of said first frame member for rollably supporting the front end of the first frame member on the surface;

rear wheel means on the rearward end of said second frame member for rollably supporting the rearward end of the second frame member on the surface;

the points of engagement between the surface and the front and rear wheel means defining a reference plane extending through such points of engagement;

mid-wheel means adjacent the hinge means for rollably supporting the rearward end of the first frame member and the forward end of the second frame member on the surface and for pivoting said first and second frame members relative to one another when said mid-wheel means engages a surface elevation varying from the reference plane;

a frame extension rod rigidly secured to said first frame member and extending rearwardly therefrom and terminating in a curved actuator surface;

a lever arm pivotally mounted on said second frame member and having a rearward end and a forward end with a curved surface engaging said curved surface of said frame extension rod whereby, in response to pivotal movement of said frame members, said extension rod pivots said lever arm such that said rearward end of said lever arm moves a distance corresponding to the vertical displacement of said mid-wheel means relative to said reference plane; and

recording means operatively connected to said rearward end of said lever arm for continuously recording the vertical displacement of said mid-wheel means.

4,697,353

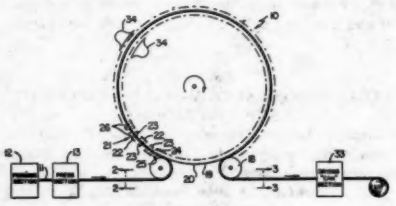
ELECTROSTATIC METHOD AND APPARATUS FOR TREATING MATERIAL

James T. Candor, 5440 Cynthia La., Dayton, Ohio 45429

Division of Ser. No. 826,556, Feb. 6, 1986, Pat. No. 4,654,979, which is a continuation of Ser. No. 757,735, Jul. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 624,006, Jun. 25, 1984, Pat. No. 4,551,924, which is a continuation of Ser. No. 548,646, Nov. 4, 1983, abandoned, which is a continuation of Ser. No. 401,078, Jun. 23, 1982, abandoned, which is a division of Ser. No. 386,703, Jun. 9, 1982, abandoned, which is a continuation-in-part of Ser. No. 319,114, Nov. 9, 1981, Pat. No. 4,404,754, which is a continuation-in-part of Ser. No. 261,784, May 8, 1981, Pat. No. 4,338,729, which is a division of Ser. No. 124,224, Feb. 25, 1980, Pat. No. 4,283,862, which is a division of Ser. No. 50,807, Jun. 2, 1979, Pat. No. 4,208,807, which is a continuation-in-part of Ser. No. 925,378, Jul. 17, 1978, abandoned, which is a division of Ser. No. 863,910, Dec. 23, 1977, Pat. No. 4,111,773, which is a continuation-in-part of Ser. No. 732,846, Oct. 15, 1976, Pat. No. 4,081,342, which is a continuation-in-part of Ser. No. 695,068, Jun. 11, 1976, Pat. No. 4,033,841, which is a continuation-in-part of Ser. No. 569,815, Apr. 21, 1975, Pat. No. 3,966,575, which is a continuation-in-part of Ser. No. 499,178, Aug. 21, 1974, Pat. No. 3,893,898, which is a continuation-in-part of Ser. No. 383,255, Jul. 27, 1973, Pat. No. 3,849,275, which is a division of Ser. No. 263,605, Jun. 16, 1972, Pat. No. 3,795,605, which is a continuation-in-part of Ser. No. 53,402, Jul. 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 25,938, Apr. 6, 1970, Pat. No. 3,687,834, which is a continuation-in-part of Ser. No. 864,851, Oct. 8, 1969, abandoned, which is a continuation-in-part of Ser. No. 811,421, Mar. 28, 1969, abandoned, said Ser. No. 569,815, is a continuation-in-part of Ser. No. 548,666, Feb. 10, 1975, Pat. No. 3,965,581, which is a continuation-in-part of Ser. No. 469,820, May 14, 1974, Pat. No. 3,931,682, and a continuation-in-part of Ser. No. 405,023, Oct. 10, 1973, Pat. No. 4,060,449, and a continuation-in-part of Ser. No. 499,178, Aug. 21, 1974, Pat. No. 3,893,898. This application Jun. 25, 1986, Ser. No. 878,177

Int. Cl.[4] F26B *3/34, 23/04*

U.S. Cl. 34—1 **10 Claims**



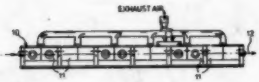
1. In an infrared heating apparatus for drying moisture bearing material, said apparatus comprising infrared heating means for emitting infrared heating energy, a hood means having an open end facing one side of said moisture bearing material, means in said hood means for directing said infrared heating energy from said hood means out through said open end thereof, insulating means carried by said hood means and substantially closing said open end of said hood means for transmitting said infrared heating energy therethrough to said moisture bearing material to tend to dry the same, and means for causing relative movement between said moisture bearing material and said open end of said hood means, the improvement comprising electrostatic means carried by said hood means for creating a plurality of electrostatic fields through which at least said one side of said moisture bearing material passes therethrough as said moisture bearing material is being heated by said infrared heating energy and said relative movement is being provided between said moisture bearing material and said hood means.

4,697,354

DRIER FOR MOVING SHEET MATERIAL

Karl-Heinz Gottschalk, Hamburg, Fed. Rep. of Germany, assignor to Babcock Textilmaschinen GmbH, Seevetal-Maschen, Fed. Rep. of Germany

Filed Aug. 28, 1985, Ser. No. 770,069
Int. Cl.[4] F26B *3/04, 13/02*
U.S. Cl. 34—23 **8 Claims**



1. A drier for conveying and drying webs of material wherein the web passes through sequentially arrayed substantially identical front, central and back drying zones disposed within a hermetic drier housing, during the drying treatment, the drier including means for supplying air to the zones and means for moving, heating and circulating air, within the zones, and seals disposed at the entry and exit of the drier housing, said drying treatment implemented by fresh air, circulating air and exhaust air, wherein the improvement conprises:

an exhaust duct for evacuating exhaust air by suction from all zones of the drier only in the direction of travel of the web, said duct centrally connected to only said back zone; and

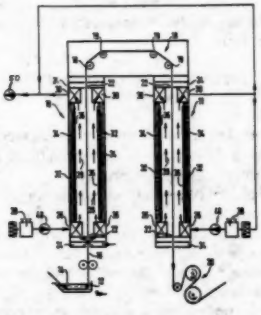
means for controlling the evacuation of exhaust air as a function of the moisture in it.

4,697,355

METHOD AND INSTALLATION FOR DRYING A CONTINUOUS MATERIAL IMPREGNATED WITH A HARDENABLE SYNTHETIC RESIN

Takeyasu Mino, Kobe, and Mitsuaki Harada, Ashiya, both of Japan, assignors to Sinter Limited, Bristol, United Kingdom

Filed Mar. 29, 1985, Ser. No. 717,836
Claims priority, application Japan, Apr. 2, 1984, 59-048635[U]; Apr. 2, 1984, 59-048636[U]
Int. Cl.[4] F26B *3/30*
U.S. Cl. 34—41 **17 Claims**



1. A method for drying a continuously formed material, impregnated with a hardenable synthetic resin, in a treating chamber, the method comprising:

moving the continuously formed material along a path within the treating chamber;

applying heat to the continuously formed material in the form of radiant heat and thereby drying the material;

introducing preheated fresh air into the chamber in a direction which extends parallel to said path;

directing the preheated fresh air in the chamber as a substantially laminar current of preheated fresh air parallel to the surface of the material as soon as the preheated fresh air is introduced into the chamber so as not to be blown directly on the material thereby diluting gaseous substances evaporating from the material when it is dried by the said application of the radiant heat; and

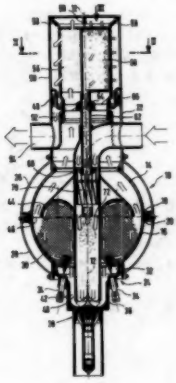
at least partially exhausting the gaseous substances diluted by said preheated fresh air.

4,697,356

FLUIDIZED BED APPARATUS

Herbert Hüttlin, Daimler Strasse 7, 7853 Steinen, Fed. Rep. of Germany

Filed Aug. 6, 1986, Ser. No. 893,628
Int. Cl.[4] F26B *17/10*
U.S. Cl. 34—57 A **9 Claims**



1. A fluidized bed apparatus for treating pulverulent and granular material comprising

(a) a vessel having a dish-shaped extension,

(b) an immersion tube protruding into the vessel and ending within the dish-shaped extension, said immersion tube being connectable to a source of gas such that gas will flow through the immersion tube toward the extension and then be deflected by the extension so as to move material within the vessel;

(c) a filter casing attached to the vessel as a gas outlet from the vessel;

(d) a filter contained within the casing to prevent the outlet of material from the vessel, said filter having at least one rotatable vane which sweeps across the filter to remove material collected thereon; and

(e) a turbine positioned within the immersion tube and connected to the vane so as to drive the rotation thereof.

4,697,357

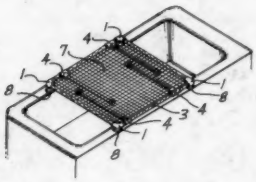
GARMENT-DRYING NETTING PLATFORM

Art Van Vliet, 1903 NE. 130 Pl., Seattle, Wash. 98125

Filed Jan. 30, 1984, Ser. No. 575,300
Int. Cl.[4] F26B *9/10*
U.S. Cl. 34—148 **3 Claims**

1. A rectangular platform for supporting a garment spread thereon to dry comprising a rectangular nonmetallic nonrigid

netting panel having edge portions, a rectangular marginal frame having corners and including rigid side members connected to said netting panel edge portions, respectively, for stretching said nonmetallic nonrigid netting panel, at least two opposite ones of said side members being of a length to enable said netting panel to span a bathtub having opposite rims, suction cups on the same side of each corner of said frame,



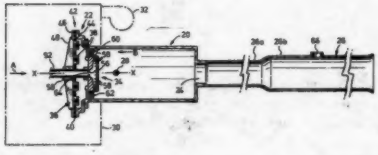
projecting laterally beyond said frame and engageable with the opposite rims of a bathtub for supporting said netting panel slightly elevated above the bathtub rims, and a suspension sling including a suspension fitting and four cord leg members diverging downward from said fitting, each cord leg member including a loop for straddling a corner of said frame and to be hooked behind said suction cup on such frame corner for attaching said cord leg member to that frame corner.

4,697,358

PULSE COMBUSTION APPARATUS

John A. Kitchen, Hastings, Canada, assignor to John A. Kitchen Ltd., Hastings, Canada

Filed Sep. 9, 1986, Ser. No. 905,222
Int. Cl.[4] F26B *23/02*
U.S. Cl. 34—191 **22 Claims**



1. A pulse combustion apparatus comprising:

a combustion chamber having inlet means for fuel charges and an outlet for exhaust gases remote from the inlet means;

an exhaust pipe extending from said exhaust gas outlet and forming a resonant system with the combustion chamber; and,

means operable to initiate combustion in said chamber;

wherein said fuel charge inlet means comprises:

a fuel gas distributor forming a bluff body within the combustion chamber and defining an annular combustion air passageway around the body, the distributor having a fuel inlet for connection to a fuel supply externally of the combustion chamber, and a plurality of discrete fuel gas outlets extending around a peripheral surface of the bluff body and from which individual gas streams issue when the apparatus is in operation; and,

valve means for admitting air to said air passageway during low pressure portions of the pulse combustion cycle;

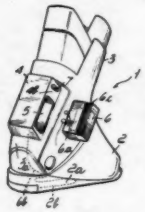
whereby, at each cycle, a striated charge having streaks of gas and air is introduced into the combustion chamber.

4,697,359

FOOTWEAR STRUCTURE INCORPORATING A HEATING DEVICE PARTICULARLY FOR SKI BOOTS

Renzo Balbinot, Vittorio Veneto, Italy, assignor to Nordica S.p.A., Montebelluna TV, Italy

Filed May 9, 1986, Ser. No. 861,287
Claims priority, application Italy, Jun. 11, 1985, 22141/85[U]
Int. Cl.[4] A43B *7/02, 5/04*
U.S. Cl. 36—2.6 **5 Claims**



1. A footwear structure including a composite heating device particularly for ski boots, the footwear structure comprising a shell, leg portions and sole defining portions, an open seat formation in one of said leg portions, said seat formation having an opening at a perimeter surface thereof and mating internal surface portions, the composite heating device comprising electrically powered heating means at least in part arranged in said sole defining portions and electrical energy source means received in said seat formation and circuit means electrically connecting said electrical energy source means and said electrically powered heating means, wherein said composite heating device further comprises

a self contained removable receptacle member enclosing therein said elctrical energy source means and having outwardly exposed electrical terminal means and mating perimetral surface portions for removable mating engagement with said mating internal surface portions provided in said seat formation and closing said opening thereof,

said seat formation having mating electric terminal means contained therein and removably connectable with said outwardly exposed electric terminal means, said mating terminal means being a component part of said circuit means electrically connecting said electrical energy source means and said electrically powered heating means.

4,697,360

SKI BOOT WITH SELF-POWERED SKI BOOT CONTROL DEVICES

Leo Sartor, Caerano, Italy, assignor to Caber Italia S.p.A., Montebelluna, Italy

Filed Jun. 2, 1986, Ser. No. 869,515
Claims priority, application Italy, Jun. 5, 1985, 41564 A/85
Int. Cl.[4] A43B *7/02, 5/04*
U.S. Cl. 36—2.6 **9 Claims**

1. In a ski boot having a ski boot outer surface and being connectable with a ski having ski safety bindings, a self-powered ski boot control device comprising:

a plurality of photovoltaic cells evenly arranged on said ski boot outer surface,

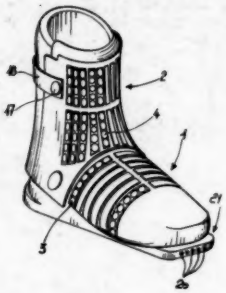
an electronic control circuit connected with said photovoltaic cells for mutually connecting said photovoltaic cells and generating a supply current having desired instantaneous characteristics,

storage batteries connected to said electronic control circuit for receiving therefrom said supply current,

electric service elements including boot closure sensors and overload sensors fed by said storage batteries and located in present areas of said boot for generating sensors signals

indicating selectively boot opening and overload conditions, and

electronic control means fed by said storage batteries and connected to said electric service elements for receiving therefrom said sensor signals and generating control signals supplied to the ski safety buildings for actuation thereof.



4,697,361

BASE FOR AN ARTICLE OF FOOTWEAR

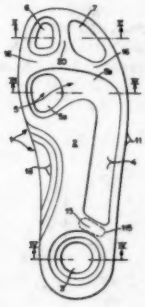
Paul Ganter, Tannenweg 21, and Max Ganter, Rosenweg 7, both of D-7808 Waldkirch, Fed. Rep. of Germany

Filed Feb. 3, 1986, Ser. No. 825,459

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1985, 3527938

Int. Cl.⁴ A43B *13/00, 13/04, 13/20*

U.S. Cl. 36—28 **32 Claims**



1. A footwear base containing an elastically deformable cushioning amterial and having an upper surface for supporting the weight of the foot and a substantially plane lower surface arranged to contact the ground, said base including a first part which absorbs more pronounced shocks and a second part which absorbs less pronounced shocks when the article of footwear embodying the base is in use, said lower surface having recessed portions on said first part, and said first part comprising a first section for the ball of the foot having at least one first recess, a second section for the toes having at least one second recess, a third section for the heel having at least one third recess, and a fourth section for the outer part of the instep having at least one fourth recess, each of said recesses having a depth which is related to the loading of the respective section such that the recess in a more heavily loaded section has a greater depth that the recess in a less heavily loaded section, and said base further including a marginal part, said lower surface having a substantially circumferentially complete non-recessed border portion which circumscribes all recesses in said lower surface and spaces all recesses in said lower surface from said marginal part, said lower surface further having additional portions which, together with said border portion, completely surround at least three of said recesses.

4,697,362

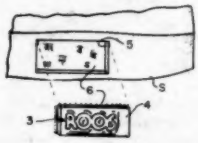
REMOVABLE INDICIA FOR FOOTWEAR, PARTICULARLY AND ATHLETIC SHOE

Albert Wasserman, St. Louis, Mo., assignor to Kangaroos U.S.A., Inc., St. Louis, Mo.

Filed Dec. 30, 1985, Ser. No. 814,763

Int. Cl.⁴ A43B *23/24*

U.S. Cl. 36—136 **3 Claims**



1. Removable indicia for footwear of the type incorporating a shoe upper securing with a shoe sole, with said shoe sole having an edge having some height and extending a substantial distance around the sides, toe, and heel of the said shoe sole, and disposed for having removably attached thereto the said indicia, comprising, support means removably held to the said sole edge, said support means having an outer surface for displaying indicia, the opposite surface of the support means having a fastener means thereon for adhering to corresponding fastener means permanently applied to the said edge of the shoe sole, and with the said support means and its indicia being removable from the said shoe sole, said fastener means comprising a hook and pile fastening means, said support means comprising a flexible base means having the indicia supported integrally thereon, said support means being removably secured to the shoe sole edge through application of the said fastener means, said sole edge extending approximately around the perimeter of the shoe sole, said sole edge having a recess therein, with said support means and indicia arranged within said sole recess, and wherein said support means and indicia are approximately flush with the sole edge.

4,697,363

ATHLETIC SHOE POCKET

Robert J. Gamm, Olivette, Mo., assignor to Kangaroos U.S.A., Inc., Chesterfield, Mo.

Continuation of Ser. No. 486,894, Apr. 20, 1983, abandoned, which is a continuation of Ser. No. 231,251, Feb. 3, 1981, Pat. No. 4,384,414, which is a division of Ser. No. 107,092, Dec. 26, 1979, Pat. No. 4,296,559. This application Nov. 27, 1985, Ser. No. 802,936

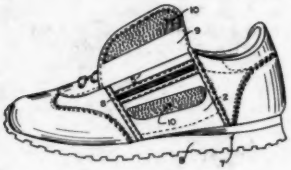
The portion of the term of this patent subsequent to Oct. 27, 1998, has been disclaimed.

Int. Cl.⁴ A43B *23/00, 5/00*

U.S. Cl. 36—136 **2 Claims**

1. An athletic shoe formed of flexible material and incorporating a pocket, comprising, an athletic shoe having a quarter portion, sole, vamp, counter, and eyestay, all securing together to form said shoe, an expansive pocket secured on the outside of said quarter portion, said pocket being of sufficiently substantial material integrally fastened with sufficient strength to said quarter portion to hold small sized personal items such as keys, coins, or the like therein, said pocket having at least one layer of flexible material contiguously disposed to the outside of the flexible material forming the quarter portion and thereby functioning to secure said type of items therein, an access opening in said pocket for inserting one of said items into said

pocket, said flexible material forming the pocket being of substantial size and extending approximately from the shoe eyestay to approximately its sole shank, and approximately between the shoe counter to its vamp portion, stitching securing at least the front and back edges of the pocket to the said shoe quarter portion, said pocket having an upper edge, the upper edge of said pocket being affixed to said shoe along its



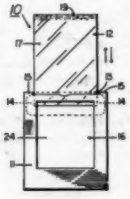
eyestay, closure means for closing said access opening, and said closure means extending approximately from one edge to another edge of the formed pocket, whereby said pocket functioning to hold said personal items such as keys or coins therein and yet permitting the wearer of said athletic shoe to participate in athletic activities without interference from such inserted items.

4,697,364

NOVELTY CARD

James G. Dean, 201 E. Bessemer Ave., Apt. #5, Greensboro, N.C. 27401

Filed Feb. 14, 1986, Ser. No. 829,512
Int. Cl.[4] G09F *19/00*
U.S. Cl. 40—445 6 Claims



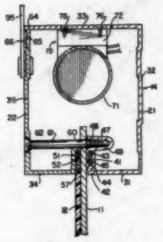
3. A novelty card comprising an envelope and a slidable insert positioned therein, said envelope having a front, a side, a back and a divider, said divider connected to said front along the bottom edge thereof, said side and back joined to said front, said back joined to said front along the top edge of said front, said top edge of said front and said back defining a slot, said front having a window therein, said insert having a transparent portion and a background portion, said transparent and said background portions being attached to each other along one edge, said insert including a stop means, said transparent portion and said background portion being separable for straddling said divider whereby withdrawing said insert from said envelope allows said transparent portion and said background portion to unite.

4,697,365

EDGE-ILLUMINATED SIGN

Dennis S. Moosbrugger, Ypsilanti; Joseph DiFazio, Troy, and David N. Watson, Livonia, all of Mich., assignors to Xebron Corporation, Ann Arbor, Mich.

Filed Sep. 25, 1985, Ser. No. 779,905
Int. Cl.[4] G09F *13/18*
U.S. Cl. 40—546 15 Claims



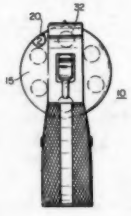
1. An edge-illuminated sign comprising:
a transparent plate;
a hollow housing including a pair of first and second elongated members which fit together to define an opening into which an edge portion of said plate is inserted, and a bracket which extends into the hollow interior of said housing from said first member;
means for releasably fastening said second member to said bracket and securing said transparent plate between said first and second members in said opening; and
means disposed within said housing for illuminating the edge of said transparent plate inserted into said opening.

4,697,366

CHAMBER INDICATOR FOR A REVOLVER OR A HAND-HELD GUN

David M. Frisoli, 2 Homestead Dr., Edison, N.J. 08817

Filed Jun. 24, 1985, Ser. No. 747,970
Int. Cl.[4] F41C *27/14*
U.S. Cl. 42—1.05 10 Claims



1. In a revolver having a rotatable cylinder, said cylinder having a plurality of chambers each for accommodating a separate cartridge, said cylinder rotatably mounted on the revolver body and having a back end which faces a user when firing the revolver, with said end abutting against a recoil plate, which plate is rigidly secured to said body, said cylinder operative to rotate each time the revolver is fired to position a new chamber and hence an accommodated cartridge in alignment with the firing pin and barrel of said revolver, the combination therewith of apparatus for informing the user of which one of the plurality of chambers is in alignment with said barrel and firing pin, comprising:
indicia means located on said back end of said cylinder and capable of identifying one chamber from another chamber, and viewing means associated with said recoil plate to

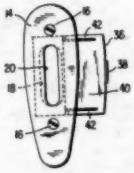
enable said user to view said indicia, said indicia means being positioned on said back end of said cylinder in such manner that an indicia means for a particular chamber is in registration with said viewing means and viewable therefrom when said particular chamber, associated therewith, is disposed in alignment with said firing pin and barrel of said revolver whereby said user can identify any of said plurality of chambers via said viewing means during the firing of said revolver.

4,697,367

BUTTPLATE WITH SLIDING COVER FOR BUTTSTOCK STORAGE CHAMBER

William S. Brophy, Northford, Conn., assignor to Marlin Firearms Company, North Haven, Conn.

Filed May 16, 1986, Ser. No. 863,946
Int. Cl.[4] F41C *23/00*
U.S. Cl. 42—71.01 8 Claims



1. A buttplate for a firearm buttstock of the type having a storage chamber formed therein for the storage of articles, said buttplate comprising:

(a) a plate member having an opening therethrough to permit access to said chamber when said plate member is attached to said buttstock and a channel formed in said plate member in communication with said opening;

(b) a cover member slidable in said channel from a first position which permits access to said chamber through said opening to a second position which prevents access to said chamber through said opening, and

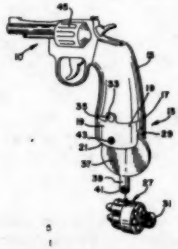
(c) locking means comprising at least one locking arm connected to said cover member, said locking arm being engageable with detent means on said plate member to maintain said cover member in said second position.

4,697,368

AMMUNITION STORAGE COMPARTMENT

Edgar L. Williams, 9529 Prairie, Chicago, Ill. 60628

Filed Nov. 10, 1986, Ser. No. 928,568
Int. Cl.[4] F41C *23/00, 27/00*
U.S. Cl. 42—71.02 6 Claims



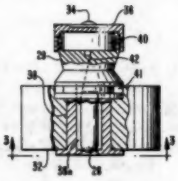
1. A readily detachable ammunition storage compartment especially adapted to releasably contain a fast loading plural cartridge holder for revolvers including a housing defining a substantially circular chamber for storage of said cartridge holder, first fastening means associated with said housing adapted to releasably secure said housing to a pistol grip, a flap connected to said housing operative to assume either an open or a closed position, said flap defining a wall of said housing when said flap assumes said closed position, second fastening means associated with said flap adapted to secure said flap in said closed position but easily and selectively releasable by a holder of said pistol to allow said flap to open whereby the cartridge holder may be released for loading of said cartridges into said revolver.

4,697,369

NIGHT LOADER FOR GUNS

Ronald K. Spears, 3519 Gallia St., New Boston, Ohio 45662

Filed Sep. 11, 1986, Ser. No. 905,965
Int. Cl.[4] F41C *27/00*; F42B *39/04*
U.S. Cl. 42—89 10 Claims



1. A cartridge speed loader for loading a gun in extreme darkness comprising:

a cylindrical cartridge housing holding a plurality of cartridges to be loaded into a cylinder of a gun, said cartridge housing having a plurality of cartridge bores to hold said plurality of cartridges; and

a combination illumination and lock assembly including a light source for illuminating a cylinder of a gun into which cartridges are to be inserted and a lock means for selectively releasing or securing cartridges within said cartridge housing.

4,697,370

FISHHOOK THREADER

E. D. Vissing, P.O. Box 437, Idaho Falls, Id. 83402

Filed Apr. 23, 1986, Ser. No. 855,501
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—1 11 Claims

1. A fishhook threader for theading leader through the eye of a fishhook, the fishhook having a shank and an eye at one end thereof, the eye being angularly bent relative to the shank, the threader comprising:

a body having an aperture for guiding the leader along a prescribed leader path through the interior of the body;

hook receiving means on said body to receive and orient the eye transversely across the prescribed leader path, the hook receiving means including an eye receiving cavity positioned across the prescribed leader path;

releaseable gripping means movably mounted on the body

for positively locking the eye within the eye receiving cavity, the gripping means being selectively operable between a first gripping position and a second release position, the gripping means preventing the eye from being removed from the receiving cavity when in said first position;

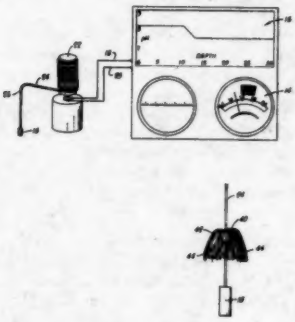
alignment means separate from and movable with respect to the gripping means for accurately centering the eye within the receiving cavity with respect to the prescribed leader path, the alignment means being movable from an operative aligning position projecting through the eye when performing an aligning function to an inoperative position removed from the eye to permit threading of leader through the eye, the gripping means maintaining proper centering alignment of the eye within the receiving cavity with respect to the prescribed leader path after the alignment means has been moved from the operative to the inoperative position.

4,697,371

METHOD AND APPARATUS FOR LOCATING AND CATCHING FISH

Loren G. Hill, 2826 Castlewood, Norman, Okla. 73069

Division of Ser. No. 607,273, May 4, 1984, Pat. No. 4,578,889.
This application Feb. 18, 1986, Ser. No. 830.573
Int. Cl.[4] A01K *79/00*
U.S. Cl. 43—4 **1 Claim**



1. Apparatus for catching fish comprising:

a boat;

a pH sensing device for sensing the pH of the water;

an elongated flexible element having a lower end and a lower end portion positioned above the lower end, said flexible element having the pH sensing device secured to said lower end thereof for lowering the pH sensing device into the water from the boat;

a readout means on the boat connected to the pH sensing device, and located on the boat for indicating to a fisherman in the boat, the depth to which the pH sensing device has been lowered, and the water pH the device senses at that depth;

tackle carried on the boat for lowering a fish catching lure in the water, said tackle including means for positioning the lure in a position which is at, or within 8 feet above, that zone in the water where the pH is shown by the pH sensing device to undergo a change in pH at a relatively great rate as compared to the rate of change of pH above or below that zone in the water;

shielding means protectively surrounding said pH sensing device;

hook means adjustably connected to said lower end portion of said elongated flexible element and located above said pH sensing device, said hook means being adjustable upwardly along the length of said elongated flexible element for selective positioning along the lower portion thereof relative to said sensing device at a location between said sensing device and the boat; and

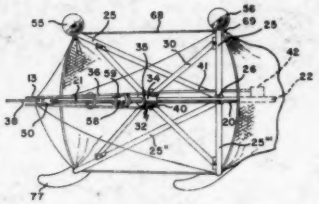
means for camouflaging said hook means.

4,697,372

DOORLESS, POSITIVE-SPREADING TRAWLING APPARATUS

Albert A. Leonard, P.O. Box 209, Quinebaug, Conn. 06262

Filed Dec. 10, 1985, Ser. No. 807,252
Int. Cl.[4] A01K *73/02*
U.S. Cl. 43—9 **7 Claims**



1. A doorless trawling apparatus for use with a fishing vessel and tow gear, comprising:

(a) an elongated, bag-shaped net having a main axis and a opening through which the main axis passes,

(b) a plurality of spreading bars emanating from a common connecting element, each bar being free to swing from a closed position along the main axis of the bag to a positively limited, open position at an angle away from the main axis, the common connecting element being an elongated, axial drag bar to which the spreading bars are each attached by a toggle mechanism,

(c) a slider assembly secured to the axial common connecting element, but capable of longitudinal movement, the assembly comprising a sleeve and a plurality of pivot points,

(d) a plurality of mediator bars, each pivotally connected at one end to the slider assembly and each pivotally connected at the other end to one of the spreader bars, and

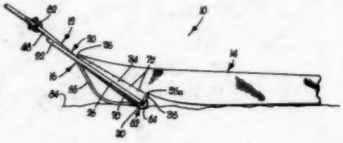
(e) means for applying a towing force by said tow gear to the common connecting element.

4,697,373

SHRIMPING/FISHING NET WITH VIBRATORY BOTTOM ROLLER

Billy D. May, Port St. Joe, Fla., assignor to Boats of the Future, Inc., Lilburn, Ga.

Filed Mar. 27, 1985, Ser. No. 716,747
Int. Cl.[4] A01K *73/02*
U.S. Cl. 43—9 **5 Claims**



1. A pull-behind net-supporting frame assembly for shrimping or fishing operations, comprising a frame defining an upright, elongated, transversely extending, open catch receiving mouth;

means for attachment of a net in trailing relationship to said frame and in disposition for capturing catch passing through said mouth, said frame further including a plurality of elongated, laterally spaced apart fingers supported

by said frame forwardly of said roller means and extending in an upright direction for a substantial portion of the vertical extent of said mouth; and

elongated, axially rotatable, bottom-engaging roller means operatively coupled with said frame and located along the normal underside of the frame for supporting the latter, said fingers terminating at their lower ends, at a point below the upper periphery of said roller means for preventing movement of the fingers rearwardly past the roller means.

4,697,374

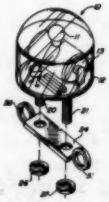
BIOLUMINESCENT SIMULATOR AND METHOD

Robert A. Simms, 3334 N. 60th St., Scottsdale, Ariz. 85018

Continuation of Ser. No. 694,807, Jan. 25, 1985, Continuation-in-part of Ser. No. 536,542, Sep. 28, 1983, abandoned. This application Oct. 6, 1986, Ser. No. 915,551

Int. Cl.[4] A01K *85/01*

U.S. Cl. 43—17.5 **3 Claims**



1. A method for simulating the light emitting characteristics of specific marine orgranisms such as dinoflagellates or plankton to attract salt water aquatic creatures including the steps of:

providing an underwater light source for emitting light with wavelengths corresponding to the wavelengths of light of the bioluminescence of a specific marine orgranism to be simulated;

causing said light source to intermittently produce pulses of light therefrom having rise times, decay times, and a repetition frequency each selected to correspond to the rise times, decay times, and repetition frequency of the bioluminescence of the specific marine organism to be simulated; and

placing said light source underwater in a location for attracting said saltwater aquatic creatures.

4,697,375

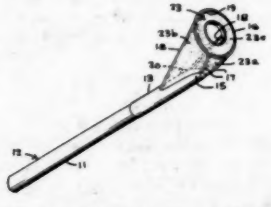
FISHING POLE TIP POSITION SIGNALLING LIGHT ASSEMBLY

Kenneth L. Mills, Charleston, W. Va., assignor to The Nite-Striker Company, Inc., Marmet, W. Va.

Continuation-in-part of Ser. No. 779,692, Sep. 24, 1985, abandoned. This application May 22, 1986, Ser. No. 865,836

Int. Cl.[4] A01K *87/04*

U.S. Cl. 43—17.5 **6 Claims**



1. A lightweight, compact, fishing pole tip position illuminating device attachable to the tip end of a fishing pole to indicate to a person using the pole the position and movement of the pole under conditions of low visibility, a tip assembly including a substantially cylindrical mounting sleeve member and a fishing line guide ring formation, the sleeve member having a bore extending through most of its length opening rearwardly thereof of a diameter corresponding substantially to the diameter of the tip end of the pole to be fitted onto and fastened to the tip end of the fishing pole, said guide ring formation having a circular guide ring portion and supporting arms fixed to said guide ring portion and to said mounting sleeve member to position said guide ring portion at the tip end portion of the fishing pole, a junction diode type LED light emitter means incorporated in said tip assembly, and light circle photoluminescence means receiving light energy from said LED light emitter means for producing at least a circular zone of visible light extending adjacent the circular path of said guide ring portion, and electrical supply means for energizing said LED light emitter means wherein said light emitter means and said light circle photoluminescence means are formed as a circular LED member conforming to and carried as an encircling annulus bonding confronting surface portions of said circular guide ring portion.

4,697,376

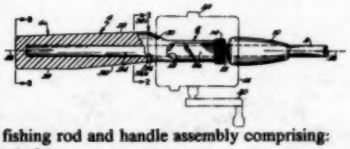
PALMING GRIP FISHING ROD

John E. Brackett, Minneapolis, and Larry J. Dahlberg, Brainerd, both of Minn., assignors to Fishing Designs, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 842,309, Mar. 21, 1986, which is a continuation-in-part of Ser. No. 610,609, May 15, 1984, Pat. No. 4,577,432. This application Dec. 29, 1986, Ser. No. 946,823

Int. Cl.[4] A01K *87/00*

U.S. Cl. 43—23 **30 Claims**



1. A fishing rod and handle assembly comprising:

a rod shaft;

an elongated handle secured to said rod shaft;

a reel seat segment on said handle having a reel seat thereon;

a butt grip segment on the rear end of said handle behind said reel seat segment, said butt grip segment being laterally offset from the longitudinal, central axis of said rod shaft, at least at a forward location on said butt grip segment behind said reel seat segment, towards the opposite side of said reel seat from that on which the crank of a reel mounted on said reel seat will be located.

4,697,377

FINGER GRIP ATTACHMENT FOR A FISHING ROD

Russell D. Martin, 8087 Aubun Rd., Winnebago, Ill. 61088

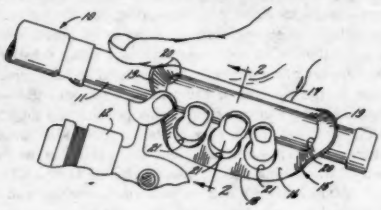
Filed Oct. 14, 1986, Ser. No. 918,118

Int. Cl.[4] A01K *97/00*

U.S. Cl. 43—23 **10 Claims**

1. A finger grip attachment for the handle of a fishing rod, said attachment comprising a single strip of flexible material formed separately of said handle, means for securing said strip to said handle with a portion of said strip curving around at least part of said handle and with another portion of said strip projecting downwardly from the lower side of said handle, at least one finger hole extending through said downwardly projecting portion of said strip, said strip being formed with

two additional holes spaced above said finger hole and located on opposite sides of said finger hole, said additional holes



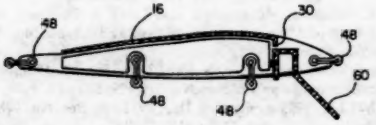
receiving said handle and constituting said means for securing said strip to said handle.

4,697,378

FISHING LURE SYSTEM

John R. Tunstall, Charlotte, N.C., assignor to Quixotic, Inc., Charlotte, N.C.

Filed Oct. 3, 1985, Ser. No. 783,594
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.09 **29 Claims**



1. A fishing lure, comprising:
a base section having a head portion, and a body portion extending rearwardly from said head portion, a downwardly opening cavity being provided in the underside of said head portions;
a removable back adapted to engage said base;
a nose plane assembly having a base adapted for insertion and engagement in said cavity, a retaining lug affixed to said nose plane assembly for engagement in a mating recess within said cavity, and means for disengaging said lug from said mating recess for removal of said nose plane assembly, and an action-creating portion exterior of said cavity;
means affixed to said head portion for attaching a fishing line thereto; and
means affixed to said body portion extending rearwardly from said head portion for receiving at least one fishing hook.

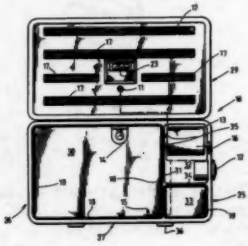
4,697,379

FISHING TACKLE BOX WITH FLASHLIGHT AND INTERNAL LIGHTING

Charlotte W. McPhaul, P.O. Box 818, McDade, Tex. 78650

Filed Mar. 28, 1986, Ser. No. 845,625
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—54.1 **3 Claims**

3. An illuminated tackle box with flashlight comprising:
(a) a substantially rectangular body,
(b) a cover hinged on the body equipped with a closure member to secure the cover to the body when the cover is in the closed position,
(c) a carrying handle for hand-carrying the tackle box mounted on the upper surface of the cover, the space enclosed by the cover being approximately equal in volume to that enclosed by the body,
(d) folding translucent trays mounted within the upper portion of the body which, when in the retracted position are partially within the confines of the body of the tackle box and the lower portion of the space defined by the cover when it is in the closed position and, when in the extended position, substantially overhang the open cover,
(e) the body of the box having three compartments, the largest of which is lined on its bottom and side surfaces with an approximately quarter-inch layer of a soft, resilient, absorbent material such as cork, a smaller compartment lined in the same fashion as the largest compartment, and a third compartment, the electrical compartment, which contains battery connectors and space for a storage battery, and is equipped with a substantially watertight lid,
(f) an exterior light projecting through the side of the box comprising a parabolic reflector, a bulb, and a lens, and associated electrical wiring as means for supplying current from a battery to the light, the electrical compartment being substantially watertight so as to protect the electrical components contained therein from the elements and to protect the contents of the other compartments of the tackle box from contact with corrosive material should the battery develop a leak,



(g) a switch in circuit with the electrical wiring for controlling the flow of current from the battery to the exterior light, the switch being mounted on the cover of the box sufficiently near the carrying handle that it may be actuated with the thumb of the hand grasping the carrying handle without releasing one's grip on the handle,
(h) interior lights, one interior light being mounted within the body of the box so as to illuminate the interior of the largest compartment of the body and the translucent plastic trays when they are in the unextended position and another interior light being mounted on the undersurface of the cover so as to illuminate items of tackle stored in the cover and the folding, translucent trays when they are in the extended position, the interior lights being connected in parallel with each other and the battery connectors,
(i) two interior-light switches, one being a manually operated switch located within the body of the box and the other being a normally-closed microswitch mounted so as to be actuated by the cover of the box as it is opened and closed, the switches being in series with the interior lights, and
(j) strips of permanently magnetic material mounted on the undersurface of the cover of the box for use in storing and separating small items of ferromagnetic tackle such as hooks and artifical flies.

4,697,380

BAIT CONTAINER

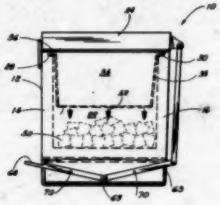
Dale Fenske, 2027 Comet St., New Orleans, La. 70114

Filed Apr. 14, 1986, Ser. No. 851,731
Int. Cl.[4] A01K *97/04*
U.S. Cl. 43—55 **9 Claims**

1. A bait container apparatus comprising:
a. a main container defined by four side walls, a bottom

portion, and a top portion movable between open and closed positions;

b. a bait containing portion comprising a basket and housed within the upper section of the main container, and suspended within the main container a distance from the bottom portion of the container;



c. a portion of the main container intermediate the bait containing portion and the floor of the container for housing ice so that the bait contained within the bait containing portion is maintained at a temperature at or about freezing; and

d. opening and closing means, actuated by foot pressure, for moving the top portion from a closed sealing position to an open position for access into the container.

4,697,381

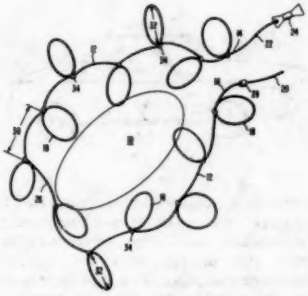
LINEAR CRAB TRAPPING DEVICE

Michael Esgro, 7 Lawrencia Dr., and Myron Jurczynski, 175 Federal City Rd., both of Lawrenceville, N.J. 08648

Filed Jan. 21, 1987, Ser. No. 5,547

Int. Cl.[4] A01K *69/00*

U.S. Cl. 43—100 **18 Claims**



1. A linear crab trapping device adapted to be wrapped around a piece of bait, said trapping device comprising:

(a) a main line means extending longitudinally and adapted to be wrapped around a piece of bait for surrounding of same, said main line means including an upper end means attached with respect to a user and a lower end means adjacent the bait; and

(b) a plurality of loop means each being secured with respect to said main line means and positioned in spaced relation with respect to one another therealong, each of said loop means extending laterally outwardly with respect to said longitudinally extending main line means, said loop means being spaced and adjacent with respect to one another to be adapted to engage a crab feeding on the piece of bait for entangling thereof to retain the crab therein for securement with respect to said main line means.

4,697,382

DEVICE FOR GROWING PLANTS AT AN ABNORMAL GROWTH RATE IN A CONTAINER

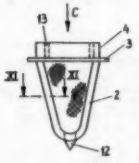
Martin Koeniger, Aalen-Wasseralfingen, Fed. Rep. of Germany, assignor to Firma Hermann Koeniger, Aalen, Fed. Rep. of Germany

Continuation of Ser. No. 707,064, Mar. 1, 1985, abandoned. This application Oct. 8, 1986, Ser. No. 917,255

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1984, 3408479

Int. Cl.[4] A01G *9/02*

U.S. Cl. 47—66 **14 Claims**



1. A device for retarding growth of a plant by limiting the nourishment and volume occupied by the plant's roots comrising, a rigidly reinforced container (9) permanently enclosing the soil and the primary roots of the plant, said container having walls that are at least partially perforated, an aperture opening upwardly to allow the plant to grow above the soil, said container having the shape of a pouch with at least one reinforcing member of a curved profile, said device further includes a guide member (1) having an annular lip (3) on the upper end thereof defining an opening wherein said container is received within the opening of the guide member and the ends of the reinforcing member and the container walls are secured to the guide member (1), said annular lip (3) further includes an upwardly extending adapter ring (4) which prevents the root of the plant from extending over the annular lip to embed in the soil outside the container.

4,697,383

CONTROLLING DEVICE FOR AN AUTOMATIC DOOR

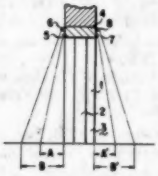
Isao Hagiwara, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Jun. 12, 1986, Ser. No. 873,357

Claims priority, application Japan, Jun. 12, 1985, 60-126347

Int. Cl.[4] E05F *15/20*

U.S. Cl. 49—25 **2 Claims**



1. A controlling device for controlling opening and closing operations of an automatic sliding door system which includes a door and a door driving mechanism, comprising a controller for controlling said door driving mechanism to open and close said door, a pair of first human body detecting sensors located on opposite sides of said door and having a small detecting area located near said door, and a pair of second human body detecting sensors located on opposite sides of said door and having a wider detecting area which extends remotely from said door and covers the detecting area of said first human body sensor, said controller being operable to develop a door

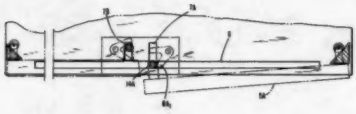
opening signal in response to a human body detection signal received from one of said first human body detecting sensors when a door closing signal is not being developed from said controller whereas said controller develops a door opening signal in response to a human body detection signal from one of said second human body detecting sensors when a door closing signal is being developed from said controller.

4,697,384

FLAT SLIDING DOOR UNIT

Yosiji Tutikawa, Osaka, Japan

Filed Apr. 25, 1986, Ser. No. 856,933
Int. Cl.[4] E05D *15/20*
U.S. Cl. 49—130 **6 Claims**



1. A flat sliding door unit comprising an upper suspension secured to the upper frame on the front of a furniture or fittings, a lower suspension secured to the lower frame on said front, and a pair of sliding doors disposed on the right and left sides and supported by said suspensions.

said upper suspension comprising a straight rail extending in the right and left directions, a pair of side rails disposed on the right and left sides and extending rearwardly from the central part of said straight rail, wherein outermost ends of said side rails lie along a central longitudinal axis of said side rails which longitudinal axes form an oblique angle with the longitudinal axis of the straight rail, and a pair of pointers for switching the door path from said straight rail to side rails,

said lower suspension comprising a straight rail extending in the right and left directions, a side space formed to extend rearwardly from the central part of said straight rail, and side paths formed to extend obliquely rearwardly from both ends of said straight rail, and,

said right- and left-hand sliding doors each being provided, at both lower ends, with a pair of lower sliding bodies to slide along the rail of said lower suspension and, further, with at least one upper sliding body to slide along the rail of said upper suspension at an upper end thereof abutting on the adjacent door.

4,697,385

SAFETY DOOR UNIT AND ROTATION GUIDE AND SUPPORT DEVICE FOR DOOR

Janine M. Zachariasen, Ancien Chemin de Cailly Houppeville, 76770 Malaunay, France

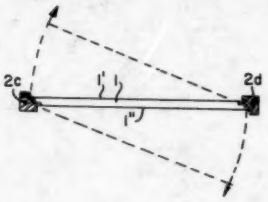
PCT No. PCT/FR84/00158, § 371 Date Mar. 6, 1985, § 102(e) Date Mar. 6, 1985, PCT Pub. No. WO85/00194, PCT Pub. Date Jan. 17, 1985
PCT Filed Jun. 21, 1984, Ser. No. 712,688
Claims priority, application France, Jun. 24, 1983, 83 10434
Int. Cl.[4] E05B *65/10*
U.S. Cl. 49—141 **5 Claims**

1. A supporting and guidance device for a pivotally mounted door, comprising:

a casing having no rebate at a top thereof and having left and right rebates along opposite sides of the casing, the left and right rebates defining stops on opposite sides of the door, the rebates having a reversed profile from one another;

hinge means pivotally mounting the door at one side of the casing, including a first connecting element fixed to the casing and a second connecting element fixed to the door, the first and second connecting elements being rotatably connectable to one another to define a pivot along a longitudinal hinging of the door in the casing, thereby pivotally mounting the door to open in a first opening direction relative to the casing, whereupon a first edge of the door is moved away from one of said left and right rebates; and,

control means accessible from an outer face of the door when the door is closed to said first opening direction, the control means being operable to disconnect the first and



secon connecting elements from one another, whereby the pivot is released and the door is released from the casing along the hinge axis, whereby the door is made openable in a direction opposite said first opening direction, and whereupcn a second edge of the door opposite said first edge is moved away from the other of said left and right rebates.

4,697,386

CONSTRUCTION OF DOOR IN MOTOR VEHICLE

Hiroyuki Watanabe; Eiichi Hamada, both of Toyota; Motomu Hayashi, Okazaki, and Kenji Ono, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 27, 1984, Ser. No. 635,202
Claims priority, application Japan, Jul. 29, 1983, 58-119490[U]
Int. Cl.[4] E05F *11/38*
U.S. Cl. 49—374 **8 Claims**

1. A door in a motor vehicle, which comprises: a door glass, a door glass piece, and a guide groove, said door glass piece being of a substantially crank shape and having a forward end sliding portion offset into the vehicle and secured to an end portion of said door glass, said sliding portion of said door glass piece being slidably guided by said guide groove on a door frame aligned to enable opening and closing of said door glass while the outer surfaces of the door glass and the door frame are substantially flush with each other, wherein said sliding portion of said door glass piece and said door glass are formed such that a first angle formed by a center line of said sliding portion and the outer surface of said door glass is less than 180°, the outer surface of the vehicle being curved and said door glass conforming to the curvature of the outer surface of a vehicle body, which is continuously formed by the outer surfaces of said door glass and said door frame, wherein the outer surface of said door glass and the outer surface of said door frame have a substantially continuous convex outer surface extending in the widthwise direction of the vehicle body, said first angle being substantially equal to a second angle formed by a line tangent to the outer surface of said door glass at an intersection between the center line of said sliding portion and the outer surface of said door glass and a line tangent to the

outer surface of said door frame at a position on the outer surface of said guide groove.

4,697,387

DEVICE FOR GRINDING TOOTH PROFILES OF A ROTATING TOOTHED WORKPIECE

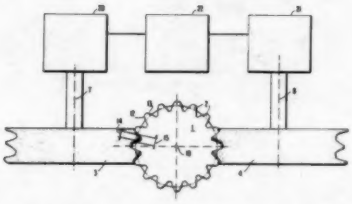
Walter Wirz, Pfäffikon, Switzerland, assignor to Reishauer AG, Zurich, Switzerland

Continuation-in-part of Ser. No. 698,660, Feb. 6, 1985, abandoned. This application Jul. 3, 1986, Ser. No. 882,062

Claims priority, application Switzerland, Feb. 10, 1984, 657/84

Int. Cl.[4] B24B *39/00*

U.S. Cl. 51—88 **6 Claims**



1. A device for grinding the tooth profiles of a workpiece with helical teeth comprising:

means for mounting the workpiece such that it freely turns;

at least two identically shaped globoidal tools each with toothlike protrusions for engaging the tooth gaps of the workpiece, the width of the protrusions being narrower than the desired width of the finished workpiece tooth gaps;

the tool axes crossing each other and having equal distance from and forming the same angle with the workpiece axis;

means for simultaneously rotating the at least two tools in the same direction; and

means for imparting a torque to one of said tools relative to another of said tools to thereby shift the workpiece in a manner causing one of said tools to contact only the left side of the workpiece tooth profiles, while another of said tools contacts only the right side of the workpiece tooth profiles;

said means for imparting a torque comprising control means for controlling the speed at which one of the tools is angularly displaced relative to the other and for controlling the position of one tool relative to the other by controlling the amount of angular displacement.

4,697,388

ARRANGEMENT FOR GRINDING PLANAR ANNULAR SURFACES

Lars-Inge Larsson, Ljungsbro, Sweden, assignor to Lars-Inge Larsson med Firma Larssons Industrimekaniska Verkstad, Ljungsbro, Sweden

PCT No. PCT/SE85/00192, § 371 Date Jan. 8, 1986, § 102(e) Date Jan. 8, 1986, PCT Pub. No. WO85/05311, PCT Pub. Date Dec. 5, 1985

PCT Filed May 3, 1985, Ser. No. 833,387

Claims priority, application Sweden, May 21, 1984, 8402719

Int. Cl.[4] B24B *7/00*

U.S. Cl. 51—120 **3 Claims**

3. An arrangement for grinding planar annular surfaces, especially the sealing surfaces of valves, comprising:

a rotationally fixed hub with a center;

a rotatable planetary disc with a periphery, which disc is mounted on said hub;

a plurality of grinding heads generally mounted at said disc periphery;

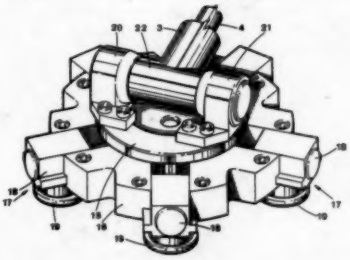
a grinding disc rotatably mounted on each of said grinding head;

a drive shaft with a conical gear mounted on said drive shaft;

an intermediate shaft rotatably mounted on said hub and operably connected to said planetary disc;

said intermediate shaft having a first shaft part and a second shaft part centrally and coaxially disposed on said planetary disc along a common center line, which center line is approximately parallel with said planetary disc, an intermediate shaft first conical gear and a second conical gear mounted and operable on each of said first part and second shaft part;

said drive shaft conical gear engaging said intermediate shaft first conical gears;



a conical gear ring concentrically disposed on said planetary disc and engaging each of said second conical gears;

said drive shaft operable to rotate said planetary disc;

effective connections connecting said hub and said grinding discs, which effective connections rotate each of said grinding discs relative to their respective grinding heads when said planetary disc is rotated relative to said hub;

said drive shaft mounted at said hub center and pivotable through an angle of approximately 180° in a plane normal to said planetary disc, thereby enabling said grinding discs to automatically align with said planar annular surfaces irrespective of the inclination of said drive shaft relative to said planar annular surfaces.

4,697,389

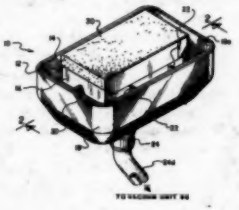
DUST-CONFINING VACUUM SANDER

Richard A. Romine, 13251 Cherry St., Westminster, Calif. 92683

Filed May 13, 1986, Ser. No. 862,661

Int. Cl.[4] B24B *23/00, 55/10*

U.S. Cl. 51—180 **13 Claims**



1. A dust-confining, vacuum sander comprising:

(a) a sanding pad having means to retain on its upper side a strip of abrasive paper,

(b) a dust confining shroud having a peripheral opening on its upper side and having on its lower surface a vacuum port with a contiguous, outwardly extending threaded nozzle with said shroud further having a supporting means for said sanding pad where said supporting means allows

the upper side of said pad to extend above the edge of the peripheral opening and provides an air space between the inside walls and bottom surface of said shroud,

(c) a hermetic connector having internal threads that allow said connector to be threaded into said threaded nozzle, and also having a captive rotatable/angled vacuum nozzle,

(d) a vacuum unit, and

(e) a vacuum attachment means that allows said angled vacuum nozzle to hermetically communicate with said vacuum unit.

4,697,390

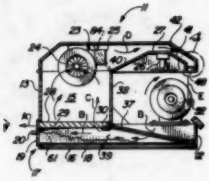
PARTICLE COLLECTION SYSTEM

Jon A. Ruopsa, 11834 S. Ki Rd., Phoenix, Ariz. 85044

Filed Jan. 28, 1987, Ser. No. 7,571

Int. Cl.[4] B24B *55/06*

U.S. Cl. 51—270 **1 Claim**



1. Abrading apparatus including

(a) a housing having a front wall and a rear wall and a particle receiving basin between said front and rear walls;

(b) a circular abrading wheel mounted on an axle in said housing above said particle receiving basin and having a cylindrical outer peripheral portion;

(c) a motor mounted in said housing and operatively associated with said axle to rotate said axle and abrading wheel, a workpiece normally being held against and contacting said wheel in a position such that particles abraded from said workpiece by said wheel are downwardly thrown toward said basin;

(d) a first air channel formed in said housing for downwardly directing a vertically oriented curtain of air over said portion of said grinding wheel contacting said workpiece and carrying abraded particles into said basin;

(e) particle depository means in said housing having a floor and an upright wall attached to and extending upwardly from said floor;

(f) a second air channel in said housing between said basin and particle depository means;

(g) recirculating fan means in said housing having an intake and an exhaust port;

(h) a third air channel in said housing between said particle depository means and said intake ports of said fan means;

(i) a fourth air channel in said housing between said exhaust port of said fan means and said first air channel, the cross sectional area of said fourth air channel tapering from said exhaust port to said first channel means to accelerate the flow of air through said fourth air channel;

said particle depository means and said first, second, third and fourth air channels and basin being shaped and dimensioned such that

(j) air continuously flows in a closed circuit through said first channel, said basin, said second channel, said depository means, said third channel, said fan means and said fourth channel; and,

(k) air flows through said second channel into said depository means in a first direction of travel and flows from said depository means into said third channel in a second direction of travel and, when said air flow changes from said first to said second direction of travel, at least certain of said abraded particles in said air generally continue in said first direction of travel and strike said upright wall of said particle depository means and fall toward said floor under the force of gravity.

4,697,391

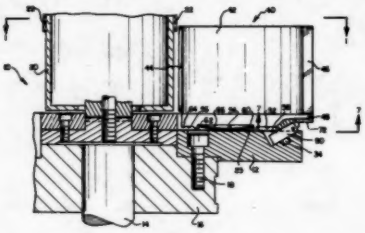
VANE RETENTION APPARATUS FOR ABRASIVE BLASTING MACHINE

James H. Carpenter, Jr., 212 Pangborn Blvd., and Kenneth R. Peters, 215 Greenhill Dr., both of Hagerstown, Md. 21740

Filed Dec. 20, 1985, Ser. No. 811,749

Int. Cl.[4] B24C *5/06*

U.S. Cl. 51—434 **16 Claims**



1. A vane for use in an abrasive blasting machine having a rotatable runnerhead, a radially extending channel in the runnerhead opening through one face of the runnerhead, a slot included as part of the channel adjacent the radially outer end of the channel, and a retaining pin adapted to be fitted into the slot, the vane comprising:

a blade disposed generally perpendicular to the face of the runnerhead; and

a base disposed along one edge of the blade, the base being configured to be fitted into the channel such that the vane is secured to the runnerhead, the base defining a face opposed to the blade, the opposed face having a radially inner end and a radially outer end spaced along the length of the blade, the base defining a portion of a pin-receiving recess at the radially outer end of the opposed face, the outer end of the face including:

a first, planar surface extending into the opposed face;

a second, planar surface intersecting the first planar surface, the second planar surface being disposed generally parallel to the opposed face and spaced a short distance from the opposed face; and

a single side wall disposed along one side of the first planar surface, the first planar surface being open along an opposite side, the side wall guiding the retaining pin into the slot and aligning the pin with the longitudinal axis of the vane.

4,697,392

AIRPLANE HANGAR

Siegfried Silzle, Im Moos 10, D 8959 Füssen, Fed. Rep. of Germany

Filed Nov. 13, 1986, Ser. No. 930,811

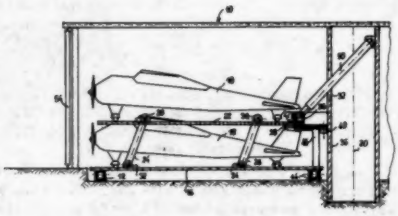
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1985, 3541868

Int. Cl.[4] E04B *1/346*

U.S. Cl. 52—65 **11 Claims**

1. An airplane hangar comprising a peripheral wall of generally circular configuration adapted to house a plurality of aircraft with their tail surfaces adjacent, at least one movable door section within said peripheral wall, a bottom wall mounted for rotation about a vertical central axis and at a level in said peripheral wall, a plurality of oblong horizontal lifting platforms radially arranged on said bottom wall with interspaces allowing an airplane to be positioned therebetween,

each one of the lifting platforms being supported by four parallel pivoted levers of equal length adapted to move the lifting platform translationally from an elevated position downwards and radially forwards into a lower position substantially on the level of the bottom wall, a single driving means for at least a



group of said plurality of lifting platforms, said driving means being mounted in an area of a sector containing the door section and comprising coupling means for automatically coupling each one of said plurality of lifting platforms being rotated into said sector to the driving means, and coupling out upon leaving said sector.

4,697,393

METAL BUILDING CONSTRUCTION

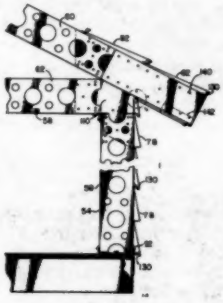
Herbert R. Madray, P.O. Box 712, Okeechobee, Fla. 33472

PCT No. PCT/US84/00782, § 371 Date Jan. 22, 1985, § 102(e) Date Jan. 22, 1985, PCT Pub. No. WO84/04771, PCT Pub. Date Dec. 6, 1984

Continuation-in-part of Ser. No. 496,960, May 23, 1983, Pat. No. 4,551,957. This PCT application May 22, 1984, Ser. No. 709,317

Int. Cl.[4] E04B *1/38*

U.S. Cl. 52—93 **10 Claims**



1. A building constructed with a primary load-bearing frame structure erected on a foundation from sets of prefabricated structural members, comprising:

a plurality of girder members, adapted for horizontal, vertical and diagonal orientation in a primary load-bearing frame structure, the girder members forming studs, headers and joists depending upon the orientation thereof, each prefabricated with identical channel-shaped cross-sections of uniform web width and a repeating pattern of connection holes, the girders being formed in a plurality of lengths in increments corresponding to the size of the hole pattern;

a plurality of plate members, each prefabricated with at least two webs having the repeating pattern of connection holes formed therein, the respective webs of each girder and each plate member being dimensioned to enable the respective webs to abut one another in substantially flush engagement and with the respective patterns of connection holes in alignment with one another;

standardized attachment means rigidly engageable with the girder and plate members through the connection holes to provide full surface engagement of the web portions, whereby a plurality of frame structures for buildings, of varied size and shape, may be easily constructed from sets of prefabricated girder members and prefabricated plate members secured together by standardized attachment means, whereby primary loads are borne by and transmitted between the girder and plate members, the web portions bearing against one another to provide high rotational rigidity and overall frame stiffness; and,

means for securing at least some of the girder members to a foundation.

4,697,394

GROUND ANCHOR WITH RECOVERABLE STEEL RODS

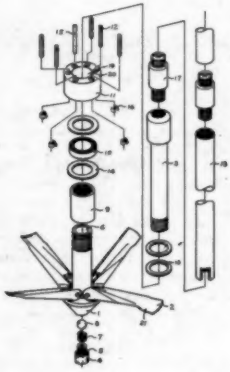
Hsi H. Lu, No. 2-6, Alley 17, Lane 76, Sec. 2, Ho Ping E Rd., Taipei, Taiwan

Filed Aug. 4, 1986, Ser. No. 892,841

The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.

Int. Cl.[4] E02D *5/74*

U.S. Cl. 52—162 **3 Claims**



1. An improved ground anchor with recoverable steel rods comprising

an anchor head, with a water outlet passing through its central line, having a spring-loaded ball and a spring at the lower end of the water outlet, a drill bit fixed to its lower end, a plurality of swingable arms fixed to an appropriate position and an outer thread at its upper end for connecting to an end of a double threaded nut;

a double threaded nut, with an end connected to the anchor head and another end to a hollow rod;

a hollow rod, with its larger end connecting to the double threaded nut so that a thrust bearing, a socket and two washers installed to it will be restricted to the smaller end, and inner thread at the larger end for connecting to a connector;

a thrust bearing, installed at the hollow rod at the position below a socket;

a socket in the form of a short cylinder with a bore slightly greater than the outer diameter of the hollow rod for insertion of the hollow rod, having a plurality of tapered fixing holes for insertion of steel rods from the top, and for insertion of two semi-conical wedges to the bottom of each fixing hole in order to fix the steel rods by frictional force; and

a plurality of connectors and connecting tubes to extend the ground anchor to a desired depth, characterized by the design of the external wall of the fixing holes with tensile strength smaller than that of the steel rod so that application of any normal extractor to pull out the steel rods after application of the ground anchor will distort and break the external wall of the fixing holes first, the friction among the semi-conical wedges and steel rods will be overcome consequently, the steel rods can be pulled out and recovered easily.

4,697,395

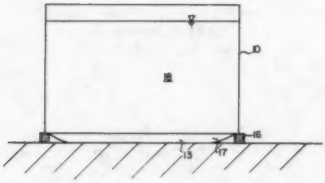
PREUPLIFT TECHNIQUE OF ANCHORING A CYLINDRICAL LIQUID STORAGE TANK FOR LATERAL LOADING

Ralf Peek, Orinda, Calif., assignor to California Institute of Technology, Pasadedena, Calif.

Filed Aug. 22, 1986, Ser. No. 899,516

Int. Cl.[4] E04H *9/02*; E02D *27/38*

U.S. Cl. 52—167 **4 Claims**



3. A combination unanchored fluid storage tank and preuplift means to balance seismically induced overturning moments comprising:

(a) tank having an upstanding side wall and a ground supported base plate; and

(b) a preuplift means comprising a ring filler inserted under said upstanding side wall to preuplift said baseplate adjacent said side wall whereby the preuplifted portion of said base plate will contribute to the resisting moment to said seismically induced overturning moment without any additional uplift of said tank side wall.

4,697,396

UTILITY POLE SUPPORT

John K. Knight, Doncaster, Australia, assignor to R.F.D. Consultants Pty. Ltd., Victoria, Australia

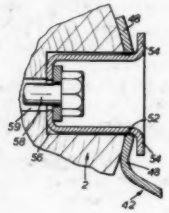
PCT No. PCT/AU84/00075, § 371 Date Dec. 18, 1984, § 102(e) Date Dec. 18, 1984, PCT Pub. No. WO84/04348, PCT Pub. Date Nov. 8, 1984

PCT Filed May 4, 1984, Ser. No. 691,189

Claims priority, application Australia, May 4, 1983, PF9168; Jul. 27, 1983, PG0518

Int. Cl.[4] E02D *27/42*

U.S. Cl. 52—170 **19 Claims**



1. A utility pole support member suitable for being securely connected to a utility pole including at least one elongate flange portion having a first surface for abutting against the pole and an elongate rib portion for providing strengtht to the support member, said support member being provided with means for securely connecting the support member to the pole, said means comprising a ferrule which in use extends into an aperture in the flange portion and into a rebate in the pole and a bolt having a head and shank which shank passes through the pole, the head of the bolt being located within the ferrule.

4,697,397

TRUSSED GIRDER, ROOF FRAMING USING THE TRUSSED GIRDER AND METHOD OF CONSTRUCTING THE ROOF FRAMING OF A BUILDING USING THE TRUSSED GIRDER

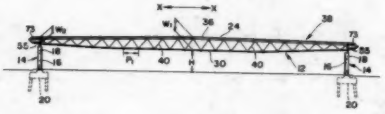
Shuji Okuda; Hideo Shimomura; Kusuo Honda; Masato Kawaguchi; Yasuo Kuno; Takenori Kumagai, and Nobuo Kato, all of Tokyo, Japan, assignors to Shimizu Construction Co. Ltd., Tokyo and Kawasaki Steel Corporation, Hyogo, both of, Japan

Filed Aug. 6, 1986, Ser. No. 893,625

Claims priority, application Japan, Aug. 10, 1985, 60-175996; Aug. 10, 1985, 60-175997

Int. Cl.[4] E04B *1/24*; E04C *3/10*

U.S. Cl. 52—223 R **13 Claims**



1. A trussed girder in which an upper chord and a lower chord are jointed through lattice members, each chord having opposite end portions, comprising:

a prestressing steel member;

attaching means for attaching opposite ends of the prestressing steel member to one of both the upper chord and the lower chord at opposite end portions of the one chord to longitudinally extend under tension so that prestress is provided to the trussed girder; and

wherein the trussed girder has a central portion, wherein the trussed girder has the larger thickness WI at the central portion thereof and gradually reduced in its thickness toward opposite ends thereof.

4,697,398

MULTISTORIED ASEISMIC BUILDING MADE OF MODULAR PANELS

Luigi Granieri, SS 3 bis, 05060 Pantalla (PG), Italy

Filed Feb. 7, 1986, Ser. No. 826,928

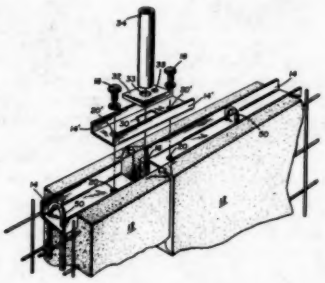
Claims priority, application Italy, Nov. 25, 1985, 48822 A/85

Int. Cl.[4] E04C *3/22*

U.S. Cl. 52—236.8 **2 Claims**

1. An aseismic multistoried building comprising: modular perimetral and interior wall panels, a concrete foundation base and at least one sheet trapezoidal furrowed floor on which a concrete slab extends, a metal profile positioned along each vertical side of a panel and imbedded into said panel; adjoining panels defining therebetween an interpanellar duct having a nearly square horizontal cross section; a threaded tie rod passing along said duct for anchoring a pair of panels to said foundation base; a metal profile positioned at the top of each of said panels and embedded into said panels; a short channel inserted into the top profiles of adjoining panels and extending horizontally across said duct; means anchoring said top profiles and short channel to each said adjoining panel; said short channel defining a central window; a plate positioned on said short channel overlapping said window; said plate defining a first hole at its center through which the tie rod passes and a second

hole offset from said first hole for pouring cement mortar therethrough and into said duct; and a short threaded tube



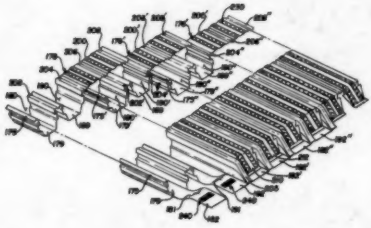
screwed onto the end of said tie rod for possible connection with a further tie rod.

4,697,399

UNIVERSAL DECK

Thomas G. Ryan, Bethel Park, Pa., assignor to Cyclops Corporation, Pittsburgh, Pa.

Filed Jan. 17, 1986, Ser. No. 819,614
Int. Cl.[4] E04B *1/70, 1/16, 1/30, 5/18*
U.S. Cl. 52—303 **7 Claims**



1. A deck structure comprising:

(a) a plurality of overlapping and interlocking members, each member formed from a single sheet of metal, and having a central portion including at least one longitudinally extending valley provided substantially in one side thereof, said valley including a base portion provided in a first horizontal plane and a pair of spaced apart webs extending upwardly from opposite sides of the base and terminating in a second horizontal plane vertically spaced above said first plane, said central portion of said member also having a substantially longitudinally extending flat flange provided on an opposite side of the sheet and extending away from an upper end of one of said webs in said second plane and covering at least one valley of an adjacent sheet, said deck structure having closed ends formed by cooperating valley base portions and flange portions of adjacent members wherein the base portions of the valleys slope upwardly and terminate in a third horizontal plane located between said first and second planes and the flanges slope downwardly and also terminate in said third plane whereby at least one valley of the deck structure is enclosed; and

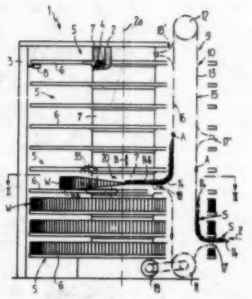
(b) a continuous layer of concrete extending over and supported at least in part by the flat flange portions of said members.

4,697,400

APPARATUS FOR STORING PRINTED PRODUCTS ARRIVING IN AN IMBRICATED FORMATION

Walter Gerber, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Dec. 15, 1986, Ser. No. 941,855
Claims priority, application Switzerland, Dec. 20, 1985, 05471/85
Int. Cl.[4] B65B *63/04*
U.S. Cl. 53—118 **16 Claims**



1. An apparatus for storing printed products having at least one face and arriving in an imbricated formation, comprising:

a plurality of support means for storing the printed products;

said plurality of support means having a substantially upright axis;

means for rotatably driving said plurality of support means about said substantially upright axis;

a delivery arrangement for delivering the printed products to said plurality of support means;

at least two support means of said plurality of support means being arranged substantially in superposition;

a respective winding core connected to each support means of said plurality of support means;

each said respective winding core having a longitudinal axis and defining conjointly with each connected one of said support means a winding unit;

said longitudinal axis of each said respective winding core extending substantially in the same direction as said substantially upright axis of said plurality of support means;

means for individually driving and individually loading each said winding unit with the printed products to be wound upon each said respective winding core for forming a wound product package on each said respective winding core; and

said delivery arrangement being constructed for delivering the printed products in a substantially upright position to each said winding core and to each said wound product package forming thereupon such that said at least one face of the printed products confronts each said winding core and each said wound product package.

4,697,401

APPARATUS WITH INTEGRAL CUTTING MECHANISM FOR FORMING WRAPPED PACKAGES

Sheldon Kessler, Chicago, and Vasilios Strubulis, Des Plaines, both of Ill., assignors to Pack-All, Inc., Chicago, Ill.

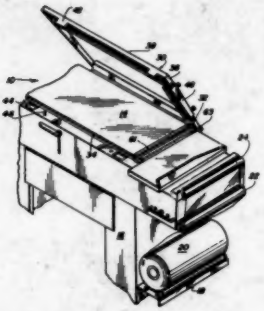
Filed Nov. 19, 1986, Ser. No. 932,334
Int. Cl.[4] B65B *9/08*
U.S. Cl. 53—459 **16 Claims**

1. A method for forming a bag, in which there is utilized an L-sealing apparatus comprising a bag formation area including a pivotal pressure frame incorporating therein a pair of transversely-mounted, heat-sealing wires for sealing portions of the

plastic film delivered to the bag formation area, said method comprising:

(a) advancing doubled-over plastic film downstream to the bag formation area;

(b) heat sealing cutting the upstream, transverse portion of the doubled-over film postioned during said step (a) to form two severed seals;



(c) simultaneously with said step (b), heat sealing the doubled over, free, longitudinal edges of the plastic film at the bag formation area which are transverse to the transverse portion sealed during said step (b); and

(d) cutting the film at a portion thereof spaced downstream from the cut made during said step (b) to form a bag with an open upstream end, said step (d) being performed before said steps (b) and (c).

4,697,402

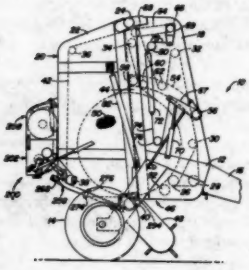
MECHANISM FOR FEEDING WRAP MATERIAL INTO A BALE-FORMING CHAMBER FOR ENVELOPING A LARGE ROUND TABLE

Henry D. Anstey; Roger W. Frimml, both of Ottumwa, Iowa, and Josef Frerich, Dietrichingen, Fed. Rep. of Germany, assignors to Deere & Company, Moline, Ill.

Filed Jul. 8, 1986, Ser. No. 883,794

Int. Cl.[4] B65B *57/04*

U.S. Cl. 53—506 **3 Claims**



1. In a large round baler having a bale chamber for receiving crop products and including driven, chamber defining elements for rotating the crop products within the chamber for forming a bale, and a bale wrapping mechanism including a wrap material feeding mechanism for introducing wrap material into the chamber for engagement with the periphery of a bale rotating within the chamber, the improvement, comprising: said wrap material feeding mechanism including a pair of frictionally interengaged drive rolls adapted for having wrap material placed therebetween for being propelled toward the bale-forming chamber; drive means coupled to one of the pair of drive rolls for selectively driving the rolls when wrapping of a bale is desired; a wrap material support roll mounted adjacent the drive rolls at a location for having the wrap material drivingly engage a peripheral portion thereof before passing between the drive rolls whereby the support roll will rotate any time wrap material is advancing through the drive rolls; rotation sensing means operatively associated with the support roll and operable for monitoring the rotation of the support roll and generating first and second output signals respectively indicative of rotation and absence of rotation; at least one indicating circuit means coupled to the rotation sensing means and including signal means responsive to the second signal for notifying an operator when the support roll is not rotating so as to indicate an exhaustion of wrap material; and said one indicating circuit means including enabling means operatively associated with the drive means for enabling the rotation sensing means only when the drive means is driving the drive rolls.

4,697,403

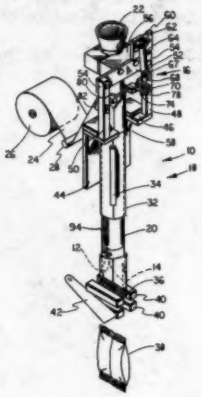
BAG SPREADERS

William W. Simpson, and Irvin G. Fulton, both of Durham, N.C., assignors to USM Corporation, Farmington, Conn.

Filed Jan. 16, 1986, Ser. No. 820,283

Int. Cl.[4] B65B *9/08*

U.S. Cl. 53—551 **2 Claims**



1. An apparatus for use in a form-fill-seal packaging machine for removing the wrinkles in the packaging film at the horizontal seal area, comprising:

a. a support means;

b. a form-fill mechanism on said support means including a tube former for forming the film into a predesired packaging configuration and a tube about which the film is formed, said tube having a lower open end portion through which a product passes into the formed film;

c. a pair of leaf springs each of which are attached to said tube lower end portion;

d. a pair of semi-conical spreaders extending downardly from and operably forming an effective continuation of the lower portion of said tube, each attached to a respective one of said leaf springs, said spreaders each having outwardly extending vanes for positioning within said film;

e. means for outwardly pivoting said spreaders against the return urgency of said leaf springs to cause said vanes to act on said film to stretch the film to remove wrinkles therein at the horizontal seal area,

f. said means comprising a linkage pivotally mounted on said support and carrying above said tube former a pair of opposed actuator rods postioned inside said tube, each of

said rods having a lower end portion coacting with said semi-conical spreaders; and

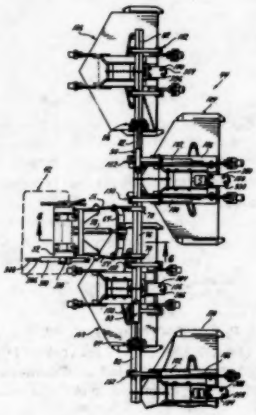
g. means to pivot said linkage to move said rods downwardly to move said spreaders outwardly.

4,697,404

TRACTOR MOWER SYSTEM

Kenneth R. Brockmeier, and Arthur E. Brockmeier, both of Edwardsville, Ill., assignors to Brockmeier Sod Farms, Edwardsville, Ill.

Filed Oct. 1, 1985, Ser. No. 782,582
Int. Cl.[4] A01D *75/30, 55/264, 55/30*
U.S. Cl. 56—6 **8 Claims**



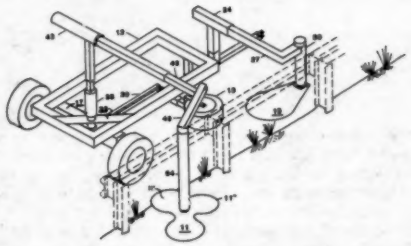
1. A tractor mower assembly for attachment and detachment to and from a general-purpose tractor of the kind having an operator's station, a vertically movable three-point hitch at the front of the tractor, a hydraulic system having a control at the operator's station for moving the hitch vertically relative to the tractor, a hitch at the rear of the tractor, and a power takeoff at the rear of the tractor, comprising a tool bar having a central section the central section having opposite ends and having two outboard sections, and a frame supporting the central section and having three connection points with connecting means for connection to the three-point hitch at the front of the tractor, a pair of central brackets connected to the ends of the central section, a pair of outboard bracket connected to the respective outboard sections, means for pivotally connecting the central brackets to the outboard brackets, respectively, to enable swinging movement of the outboard sections relative to the central section, hydraulic piston and cylinder assemblies connected between the central section and the respective outboard sections for selective swinging of each outboard section relative to the central section, hydraulic fluid conduit tubes having quick disconnect connectors for connecting the piston and cylinder assemblies to said hydraulic system to enable selective operation of the piston and cylinder assemblies from the operator's station, at least four mower units, each having three rotary blades and a hydraulic motor for rotating the blades, first and second means for pivotally suspending two of the mower units from the central section, third and fourth means for pivotally suspending two mower units from the respective outboard sections, each of the first and third suspending means including two arms connected to and projecting forward of the tool bar, each of the second and fourth suspending means including two arms connected to and projecting rearward of the tool bar, two of the mower units being pivotally connected to the forward projecting arms and two of the mower units being pivotally connected to the rearward projecting arms whereby the first two mowers are forward of the second two mowers enabling the sides of adjacent mowers to overlap without interference and avoid unmowed rows between them, means connected between the tool bar and each mower for limiting the angle of pivotal movement of the mower unit relative to the tool bar when the tool bar is raised, a hydraulic fluid reservoir and pump means, a support frame for supporting the hydraulic fluid reservoir and pump means, means for releasably connecting the support frame to the hitch at the rear of the tractor, means for releasably connecting the pump means to the power takeoff for operation of the pump means by the power takeoff, hydraulic fluid conduit tubes supported by the tractor and having front ends adjacent the front of the tractor and rear ends adjacent the rear of the tractor, front hydraulic fluid conduits for conveying hydraulic fluid through the mower motors, quick disconnect connectors for releasably connecting the front hydraulic fluid conduits to the front ends of the hydraulic fluid conduit tubes, rear hydraulic fluid conduits for circulating hydraulic fluid through the reservoir and pump means, and quick disconnect connectors for releasably connecting the rear hydraulic fluid conduits to the rear ends of the hydaulic fluid conduit tubes, whereby the central section supporting frame and the front hydraulic fluid conduits can be readily and quickly connected and disconnected from the front of the tractor and hydraulic fluid conduit tubes, and the reservoir and pump means support frame and the rear hydraulic fluid conduit means can be readily and quickly connected and disconnected from the tractor, the hydraulic fluid conduit tubes, and the power takeoff.

4,697,405

MOWING APPARATUS

Carl DeWitt, Box 126, Rte. 2, Cobden, Ill. 62920, and Gerald A. Fink, R.R. 2, Box 228, Murphysboro, Ill. 62966

Filed Dec. 24, 1985, Ser. No. 813,053
Int. Cl.[4] A01D *75/18, 55/18*
U.S. Cl. 56—10.4 **16 Claims**



1. Mowing apparatus for simultaneously mowing vegetation under and on both sides of a guardrail or the like along the side of a road, comprising a vehicle for movement along the road, a first rotary mowing unit carried by and extending from the vehicle for mowing along one side of the guardrail, and a second rotary mowing unit carried by and extending from the vehicle for mowing along the other side of the guardrail, and means supporting both of said units for movement about respective vertical axes for permitting rotation of the respective unit for movement between positions under the guardrail for mowing vegetation under the guardrail and out from under the guardrail for clearance of obstructions, the first rotary mowing unit having multiple rotary blades and comprising a deck rotatable about its vertical axis having three petal-shaped portions extending over and covering respective blades, the petal-shaped portions defining cusps between adjacent portions, the deck portions causing rotation of the first rotary mowing unit about its vertical axis upon meeting an obstruction to bring another deck portion into mowing position under the guardrail, and means for providing power-assisted rotation of the first rotary mowing unit in response to one of the deck portions

meeting an obstruction, the supporting means comprising an extensible-retractable boom extending laterally from the vehicle and a post connected to an outer end of the boom in depending relation, the post defining the vertical axis of the first rotary mowing unit, the deck being rotatably connected to a lower end of the post, the post being connected to the boom outer end by an arm extending rearwardly from the boom outer end at an angle to a longitudinal axis of the vehicle, and pivot means swingably affixing an upper end of the post to an outer end of the point for permitting rearward and outward swing movement of the post about a pivot axis laterally offset from the vertical axis of the first rotary mowing unit deck upon striking thereof of an object and for return thereof under force of gravity to a mowing position upon clearance of the object.

4,697,406

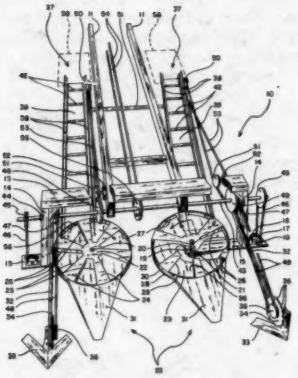
HARVESTER FOR VINE TYPE CROPS

Andrew Whitley, Rte. 5, Box 360, Zebulon, N.C. 27597

Filed Mar. 7, 1986, Ser. No. 837,141

Int. Cl.[4] A01D *46/00*

U.S. Cl. 56—327 R **5 Claims**



1. A harvester for vine type crops comprising: at least one harvester head; said harvester head including a rotatable carousel portion having a plurality of crop engaging openings therein for engaging and separating the crop from the vines, one edge of each said opening serving as a cutting edge for severing the crop from the vine, said carousel portion further including a conveyor paddle adjacent each said opening for moving the harvested crop to a central point for gathering; means for supportingly moving said harvester head adjacent said vine type crops; means for rotatingly driving said carousel portion to separate the crops from the vines; and means for gathering the harvested crop whereby an improved harvester is provided.

4,697,407

RETROREFLECTIVE FIBER AND METHOD OF MAKING SAME

Allan Wasserman, Lincoln, R.I., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 565,753, Dec. 27, 1983, abandoned, which is a continuation of Ser. No. 346,942, Feb. 8, 1982, abandoned, which is a division of Ser. No. 133,281, Mar. 24, 1980, Pat. No. 4,336,092. This application Nov. 6, 1985, Ser. No. 795,738

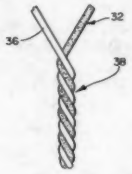
Int. Cl.[4] D02G *3/00*

U.S. Cl. 57—238 **3 Claims**

1. A retroreflective thread-like fiber consisting of:

(a) a first elongated ribbon-like strand having a substantially rectangular cross-section a thickness of approximately five mils and a width in the range between 10 and 62.5 mils and having a plurality of exposed minute glass beads bonded in a flexible elastomeric material on one surface of said strand; and

(b) a second elongated ribbon-like strand having a substantially rectangular cross-section and formed of supporting material adhered to the opposite surface of said first



strand, said second strand being approximately one-tenth as thick and the same width as said first strand whereby a composite ribbon-like fiber having a substantially rectangular cross-section is formed having said exposed beads on one surface only.

3. A composite yarn comprising the retroreflective fiber of claim 1 in twisted relation with a second non-retroreflective fiber.

4,697,408

APPARATUS FOR CONTROLLING AMOUNT OF DELIVERY IN WRAPPING MATERIAL FEED SYSTEM

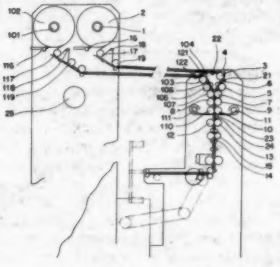
Toshihide Kohata; Masaru Miyazaki; Yoshihisa Sato, and Junichi Ikeda, all of Tokyo, Japan, assignors to Japan Tobacco, Inc., Japan

Filed Jan. 22, 1986, Ser. No. 821,538

Claims priority, application Japan, Jan. 28, 1985, 60-012574

Int. Cl.[4] D01H *13/20*

U.S. Cl. 57—264 **6 Claims**



1. An apparatus for controlling the amount of delivery in a wrapping material feed system, said apparatus comprising:

bobbin means wound with wrapping material therearound;

rotation drive means to produce a predetermined torque;

a transmission mechanism connected to an axis of said bobbin means to transmit said predetermined torque to said bobbin means;

clutch means and brake means provided within said transmission mechanism, said clutch means being adapted to transmit said predetermined torque in discretely variable fashion to said bobbin means;

sensor means for detecting a diameter of the wrapping material wound around said bobbin; and

control means for controlling said clutch means and said brake means to provide said bobbin means with an optimum torque in accordance with the detected diameter of

the wrapping material such that said wrapping material is rotated at a constant peripheral speed.

4,697,409

OPEN-END SPINNING DEVICE

Karl Handschuch, Gaimersheim, and Erich Bock, Wettstetten, both of Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

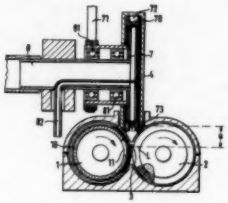
PCT No. PCT/DE85/00448, § 371 Date Jun. 30, 1986, § 102(e) Date Jun. 30, 1986, PCT Pub. No. WO86/02956, PCT Pub. Date May 22, 1986

PCT Filed Nov. 11, 1985, Ser. No. 878,977

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3441494

Int. Cl.[4] D01H *7/892, 7/895*

U.S. Cl. 57—401 **28 Claims**



1. An open-end spinning device comprising an unravelling mechanism and two friction rollers in close proximity of each other, said friction rollers being driven in the same direction and forming a notch zone and a thread forming line therebetween, fibers being twistable together into a thread along said thread forming line, and furthermore including a draw-off device and a collecting surface which moves parallel to the thread forming line, the fibers being fed over said collecting surface into the notch zone.

4,697,410

OPEN-END SPINNING DEVICE

Werner Billner, Ingolstadt, Fed. Rep. of Germany, assignor to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

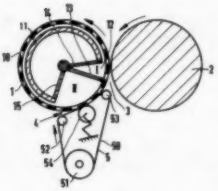
PCT No. PCT/DE85/00447, § 371 Date Jun. 30, 1986, § 102(e) Date Jun. 30, 1986, PCT Pub. No. WO86/02955, PCT Pub. Date May 22, 1986

PCT Filed Nov. 11, 1985, Ser. No. 861,558

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3441493

Int. Cl.[4] D01H *7/885*

U.S. Cl. 57—401 **15 Claims**



1. An open-end spinning device for spinning fibers, comprising two friction rollers driven in the same direction and forming a yarn forming zone and a spinning nip therebetween for receiving fibers wherein the friction roller rotating towards the spinning nip in the direction which the spinning nip receives fibers is a suction roller, whereby the fibers received by the spinning nip are twisted together into a yarn in a yarn forming zone, wherein at least one of the friction rollers is provided with a first sector subjected to negative air pressure in the spinning nip, in the range of the yarn forming zone, whereby the width of said first sector extends, in the peripheral sense, from the yarn forming zone to beyond a plane connecting the axes of the friction rollers towards the side opposite to the spinning nip, and further comprising a second sector of lesser negative pressure than said first sector on the suction roller preceding said first sector for conveying fibers into the yarn forming zone.

4,697,411

OPEN-END SPINNING DEVICE

Peter Artzt; Hans Rottmayr, and Wolfgang Bauer, all of Reutlingen, Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

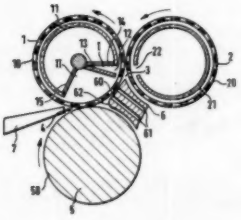
PCT No. PCT/DE85/00446, § 371 Date Jun. 30, 1986, § 102(e) Date Jun. 30, 1986, PCT Pub. No. WO86/02954, PCT Pub. Date May 22, 1986

PCT Filed Nov. 11, 1985, Ser. No. 878,973

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3441492

Int. Cl.[4] D01H *7/892, 7/882, 1/135*

U.S. Cl. 57—401 **24 Claims**



1. An open-end spinning device for spinning fibers, comprising two friction rollers driven in the same direction and forming a spinning notch therebetween, whereby at least the friction roller rotating in the direction of the spinning notch is a suction roller and includes a casing having a casing surface for receiving fibers thereon, the suction rollers conveying the fibers received on the casing surface into the spinning notch where the fibers are twisted together into a thread; a moving guiding surface; and a collecting groove for the fibers provided at a distance from the spinning notch, said groove being formed by the casing surface of the friction roller which rotates in direction of the spinning notch and by the moving guiding surface, the surface speed of which, inside the collecting groove, is synchronized with the surface speed of the suction roller.

4,697,412

APPARATUS FOR MAKING A YARN

Helmut Fuchs, Linz, Austria, assignor to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria

Filed Sep. 29, 1986, Ser. No. 912,312

Claims priority, application Austria, Nov. 4, 1985, 3163/85

Int. Cl.[4] D01H *7/898*

U.S. Cl. 57—401 **1 Claim**

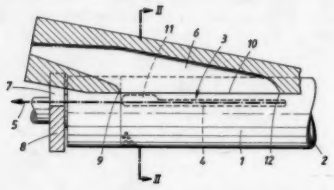
1. An apparatus for making a yarn, comprising

(a) two juxtaposed twisting drums, which are closely spaced apart and adapted to be rotated about parallel axes in the same sense, the twisting drums defining therebetween a generally triangular twisting space extending parallel to the axes,

(b) means defining a fiber-guiding passage extending into the triangular twisting space at an oblique angle to the drum axes, the fiber-guiding passage having an elongate outlet opening extending in, and along, the triangular twisting

space parallel to the axes, and the elongated outlet opening having opposite ends, and

(c) suction means defining an elongate suction zone on the periphery of at least one of the twisting drums, the suction



zone opening into the triangular space, facing the elongated outlet opening of the fiber-guiding passage and extending parallel to the axes, and the elongate suction zone having an enlarged width adjacent one of the outlet opening ends.

4,697,413

METHOD OF COOLING PARTIAL OXIDATION GAS CONTAINING FINELY DIVIDED IMPURITIES AND USED FOR COMBUSTION IN A COMBINED GAS-STEAM TURBINE OF A POWER PLANT

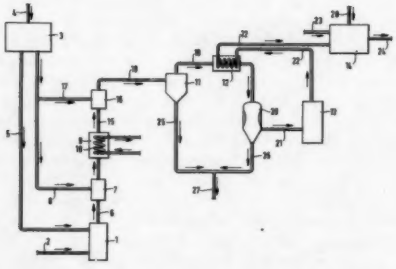
Hans C. Pohl, Vormholzerstrasse 114, 5810 Witten, Fed. Rep. of Germany

Filed Dec. 9, 1985, Ser. No. 807,438

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446715

Int. Cl.⁴ F02C *3/30, 3/28*

U.S. Cl. 60—39.02 **1 Claim**



1. A method of operating a power plant including cooling a partial oxidation gas containing finely divided impurities, the gas being produced by partial oxidation of fuels in a gasifier at a temperature above slag melting point, and comprising the steps of

quenching the crude gas exiting from the gasifier to a temperature in the range between 900° to 1,000° C. by the admixture of nitrogen and adjusting within said range the temperature of the gas-nitrogen mixture immediately below fusing or softening point of dust particles entrained in the mixture;

feeding the mixture into an indirect cooling system where the mixture is cooled down to a temperature between 900° to 500° C. and utilizing the exchanged heat for steam generation; then

discharging the mixture from the indirect cooling system and cooling down the discharged mixture by the addition of further nitrogen to a temperature between 500° to 150° C.; the

separating the finely divided impurities from the mixture;

desulphurizing the separated mixture;

feeding the clean mixture into a combustion chamber of a gas turbine of a combined gas-steam turbine power plant; said gas-steam turbine power plant including an air decomposing plant for delivering oxygen into said gasifier; and the nitrogen used for cooling the hot crude gas exiting from the gasifier and for cooling the gas-nitrogen mixture discharged from the indirect cooling system, being obtained from the air decomposing plant.

4,697,414

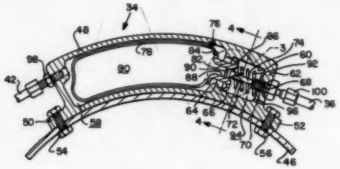
LUBRICATION APPARATUS

Robert S. McCarty, Phoenix, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 9, 1985, Ser. No. 806,587

Int. Cl.⁴ F02C *7/06*

U.S. Cl. 60—39.08 **10 Claims**



1. Lubrication apparatus comprising:

chambered housing means for receiving liquid lubricant;

collapsible closed bladder means disposed within said housing chamber for sealingly receiving said lubricant;

said housing and said bladder defining cooperating means for opening communication of said lubricant to a receiver therefor upon pressurization of said housing chamber;

said cooperating means comprising said housing defining both an elongate penetrating means for sealingly impaling said bladder means and communicating said lubricant to said receiver, and means for impaling said bladder upon said penetrating means in response to said pressurization of said housing chamber;

said means for impaling comprising said housing defining an elongate cylindrical bore opening to said housing chamber, said penetrating means defining an elongate shank disposed centrally of said bore and terminating in a sharp tip confronting said bladder means, said cooperating means comprising said bladder means defining a portion of circular section sealingly received movably within said bore in a first position confronting and spaced from said tip, said portion including a penetrable member in juxtaposition with said tip, resilient means biasing said portion to said first position, said portion being movable within said bore to a second position sealingly impaling said penetrable member upon said shank to communicate said lubricant to said receiver.

4,697,415

COMBINED GAS AND STEAM-TURBINE POWER GENERATING STATION

Ulrich Schiffers, Eckental, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim/Ruhr, Fed. Rep. of Germany

Filed Aug. 4, 1986, Ser. No. 893,098

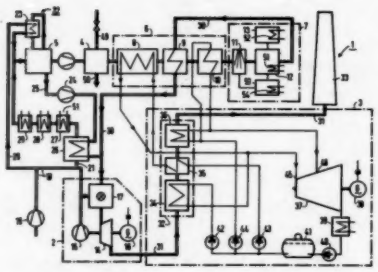
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1985, 3528073

Int. Cl.⁴ F02C *3/28*

U.S. Cl. 60—39.12 **12 Claims**

1. A combined gas and steam-turbine power generating station having a gas-turbine unit and a steam turbine unit, the gas-turbine unit having a gas turbine with a combustion chamber, a coal gasifier preceding the gas turbine unit, a heat exchanger plant including a raw gas/pure gas heat exchanger

following the coal gasifier, a gas purifier following the heat exchanger plant, a pure-gas line leading from the gas purifier to the combustion chamber of the gas turbine, an air decomposition plant with a molecular sieve regeneration circuit preceding the coal gasifier and having an oxygen line feeding the coal gasifier and a nitrogen line leading to the combustion chamber of the gas turbine, and a nitrogen compressor connected in the nitrogen line, comprising at least one air compressor preceding



the air decomposition plant and the combustion chamber of the gas turbine, and an air line connecting said air compressor to an input of the air decomposition plant, said air line being divided into two parallel branches, one of said branches including therein a heat exchanger connected into the molecular sieve regeneration circuit of the air decomposition plant and the other of said branches including therein a nitrogen/air heat exchanger leading to the combustion chamber of the gas turbine.

4,697,416

MOTOR INVOLVING THE CONTROL OF THE MIXTURE RATIO OF FUEL AND OXIDIZER FOR A LIQUID FUEL MOTOR BY MEASURING FLOWS, AND CONTROL SYSTEMS FOR CARRYING OUT THIS PROCESS

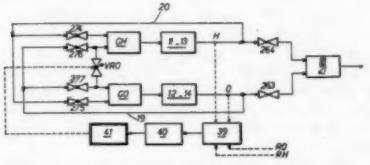
Alfred K. Scheller, Palaiseau, France, assignor to Centre National d'Etudes Spatiales, France

Continuation-in-part of Ser. No. 710,872, Mar. 12, 1985, abandoned, which is a division of Ser. No. 482,402, Apr. 6, 1983, Pat. No. 4,541,238. This application Oct. 24, 1986, Ser. No. 922,799

Claims priority, application France, Apr. 8, 1982, 8206202

Int. Cl.[4] F02K *9/48*

U.S. Cl. 60—240 **13 Claims**



1. A controller for controlling the mixture ratio of fuel and oxidizer being delivered by turbopumps to a rocket engine, comprising:

a device for processing flow measurements;

flow meters disposed at the outlet of the turbopumps supplying the rocket engine; and

means for simultaneously and inversely controlling the operation of the turbopumps in response to the flow meters.

4,697,417

TORSIONAL DAMPING DEVICE HAVING WIDE RANGE CLEARANCE, AND A HYDRAULIC COUPLING HAVING SUCH A TORSIONAL DAMPING DEVICE, IN PARTICULAR FOR A MOTOR VEHICLE

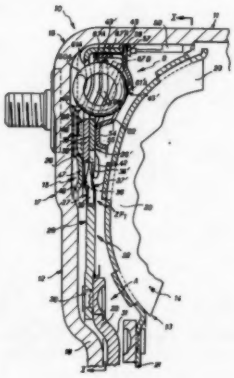
René Billet, Lamorlaye; Roland Mousston, Palaiseau, and Jean Bionaz, Fontenay-sous-Bois, all of France, assignors to Valeo, Paris, France

Filed Nov. 12, 1985, Ser. No. 796,774

Claims priority, application France, Nov. 16, 1984, 84 17493

Int. Cl.[4] F16D *33/00*

U.S. Cl. 60—338 **33 Claims**

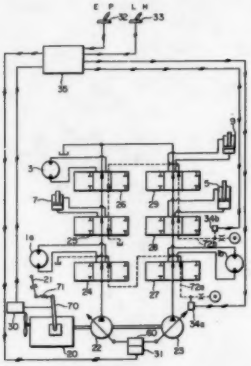


1. Torsional damper device, particularly for automotive vehicles, said device being of the kind comprising at least two coaxial parts disposed to rotate relative to each other within defined limits of relative angular displacement against circumferentially acting elastic means operative circumferentially between said parts for at least part of such relative angular displacement, said two parts including a first part comprising a hub and two flanges, said two flanges including a hub flange and a hub counter-flange, each of said two flanges forming an annular part around said hub, and each of said two flanges meshing with said hub through meshing means with clearance in a rest configuration of the device, an alternating arrangement wherein said meshing means with clearance between said hub and said hub flange are in circumferentially abutting relationship in one circumferential direction and said meshing means with clearance between said hub and said hub counter-flange are in circumferentially abutting relationship in an opposite circumferential direction, and said two parts including a second part comprising at least one member in the form of a guide ring also forming an annular part around said hub and being free to rotate relative to said hub in either circumferential direction, said torsional damper device being characterized in that, between inside and outside peripheries of said hub flange and said hub counter-flange there is at least one area of said hub flange and one area of said hub counter-flange where said hub flange and said hub counter-flange interpenetrate axially relative to each other, said area being an interpenetration area.

4,697,418
CONTROL SYSTEM FOR HYDRAULICALLY-OPERATED CONSTRUCTION MACHINERY

Nobuya Okabe, Tsuchiura; Toichi Hirata, Ushiku; Kuniaki Yoshida, Tsuchiura; Genroku Sugiyama, Ibaraki; Masakazu Haga, Ibaraki; Hideaki Tanaka, Ibaraki, and Akira Tatsumi, Tokyo, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Sep. 5, 1986, Ser. No. 904,118
Claims priority, application Japan, Sep. 7, 1985, 60-196879; Oct. 26, 1985, 60-239900; Jan. 8, 1986, 61-648
Int. Cl.[4] E02F *9/20*; F15B *9/04*
U.S. Cl. 60—434 13 Claims



1. A control system for a hydraulically-operated construction machinery comprising a prime mover, means for controlling the revolution number of said prime mover, at least one variable displacement hydraulic pump driven by said prime mover, means for controlling the displacement volume of said pump, a plurality of actuators driven by pressurized fluid discharged from the pump and a plurality of working elements driven by the respective actuators, said control system comprising:

means associated with said revolution number control means for altering the maximum revolution number of said prime mover;

means associated with said displacement volume control means for altering the maximum displacement volume of the pump;

means for sensing the operation condition of the actuators;

means for selecting an operation mode for each working element;

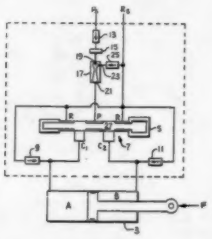
the maximum revolution number altering means providing at least one maximum revolution number of the prime mover and the maximum displacement volume altering means providing at least one maximum displacement volume so that maximum revolution numbers of the prime mover and maximum displacement volumes of the pump are arranged in a plurality of combinations, said plurality of combinations being set in association with the operation condition of the actuators and the selection of the operation mode; and

control means for selecting a combination of the maximum revolution number and the maximum displacement volume on basis of output signals of said sensor means and selection means and driving the maximum revolution number altering means and the maximum displacement volume altering means to set the maximum revolution number of the prime mover and the maximum displacement volume of the hydraulic pump to the contents of the selected combination.

4,697,419
FAST ACTUATOR

Jon R. Jeffery, Alton, Ill., and Neil J. Pierce, St. Charles, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Apr. 14, 1986, Ser. No. 852,267
Int. Cl.[4] F16D *31/02*
U.S. Cl. 60—464 8 Claims



1. In a fluid power actuator system having system pump pressure, system return, a control valve and having at least one power actuator having a pressure side and a return side which are interchangeable to drive loads in both directions, a bootstrap flow augmentation apparatus comprising:

a jet pump having primary and secondary inlet ports and an outlet port located between said system pump and said control valve in said power actuator sytem and further oriented so that said primary port is connected to said system pump, said outlet port is connected to said control valve and said secondary port is connected to said system return;

a first check valve located between said secondary port of said jet pump and said system return and oriented to permit flow from said return to said secondary port;

a second check valve located upstream of said jet pump primary port and oriented to allow flow from said system pump to said jet pump; and

means to permit flow between said return side of said power actuator and said pressure side of said power actuator when said return side pressure is higher than said pressure side pressure.

4,697,420
STIRLING CYCLE ENGINE

Naotsugu Ishiki, Tokyo, and Yuji Takei, Takasaki, both of Japan, assignors to Sanden Corporation, Japan

Filed Jun. 13, 1986, Ser. No. 873,980
Claims priority, application Japan, Jun. 13, 1985, 60-88212[U]
Int. Cl.[4] F01K *1/04*
U.S. Cl. 60—517 3 Claims

1. In a Stirling cycle type engine including a cylinder having a cylinder cap, a power piston and a displacer piston both slidably carried within said cylinder, said displacer piston dividing the interior of said cylinder into two chambers one of which is located between said power piston and displacer piston, said two chambers being connected to one another through cooler means for cooling a fluid in said apparatus, a regenerator means for absorbing heat from a fluid and heater means for heating a fluid in said apparatus, the improvement comprising:

said cooler means comprising a cooling tank formed around the lower portion of said cylinder and plurality of cooler elements, said cooler elements defining cooler flow passageways within said cooling tank, and means for circulating a cooling fluid within said cooler means;

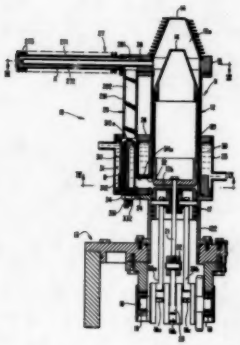
said regenerator means comprising regenerator elements defining regenerator flow passageways;

said heater means comprising heater elements defining heater flow passageways;

said cooler flow passageways, said heater flow passageways

and said regenerator flow passageways serially connected with one another;

said cooler means and said regenerator means being disposed on a common peripheral side of said cylinder and vertically aligned therewith to thereby reduce the radial extension of the engine.



said regenerator means extending vertically and parallel to but spaced from the outer peripheral wall of said cylinder, said regenerator means comprising a cylinderical tube, the upper end of said tube communicating with said heater means.

4,697,421

SUPERCHARGING PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH A TUBOCHARGER AND METHOD OF OPERATION

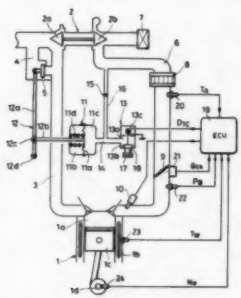
Yutaka Otobe, Shiki; Masakatsu Niikura, Asaka, and Yoshio Wazaki, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 10, 1984, Ser. No. 659,575

Claims priority, application Japan, Oct. 13, 1983, 58-191277

Int. Cl.[4] F02B *37/12*

U.S. Cl. 60—602 **15 Claims**



1. A supercharging pressure control system for an internal combustion engine having an intake passage, a throttle valve arranged therein, an exhaust passage, a turbocharger having a turbine arranged in said exhaust passage, and a compressor arranged in said intake passage, comprising: a bypass exhaust passage bypassing said turbine of said turbocharger; a waste gate valve disposed for selectively closing and opening said bypass exhaust passage; an actuator for actuating said waste gate valve, said actuator having a pressure chamber and being operatively connected to said waste gate valve such that a change in pressure within said pressure chamber causes displacement of said waste gate valve either in a direction of closing same or in a direction of opening same, said pressure chamber communicating with said intake passage at a location downstream of said compressor of said turbocharger and upstream of said throttle valve; a control valve for communicating said pressure chamber with the atmosphere; a first sensor for detecting the opening of said throttle valve; a second sensor for detecting pressure in said intake passage at a downstream side of said throttle valve; and electronic control means for actuating said control valve to adjust the pressure in said pressure chamber to thereby control supercharging pressure in said intake passage at a downstream side of said compressor, said electronic control means being operable to control through feedback the pressure in said intake passage at the downstream side of said throttle valve to reach a target value, by actuating said control valve in dependence on the difference between said target value and the pressure value detected by said second sensor, said feedback control being carried out when the detected value of said throttle valve opening exceeds a predetermined valve opening value,

wherein said electronic control means includes means for calculating a valve opening duty ratio in accordance with the sum of an integration term and a proportion term corresponding to the difference between said target value and the detected value of said intake passage pressure at the downstream side of said throttle valve, and means for actuating said control valve at the calculated duty ratio,

wherein said integration term includes an integration coefficient having a value variable in dependence on the rotational speed of said engine.

4,697,422

METHOD OF AND APPARATUS FOR CONTROLLING SUPERCHARGE PRESSURE FOR A TURBOCHARGER

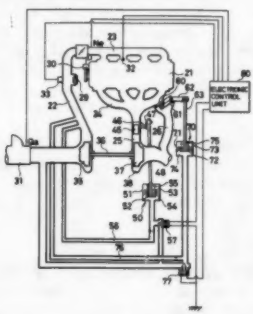
Takashi Ueno, Yokosuka, and Toshimi Abo, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa

Filed Jan. 23, 1986, Ser. No. 824,287

Claims priority, application Japan, Jan. 24, 1985, 60-11525

Int. Cl.[4] F02D *23/00*

U.S. Cl. 60—602 **12 Claims**



1. A method for controlling supercharge pressure of a turbocharger, said method comprising the steps of:

detecting an acceleration condition of an engine based on an operating condition of the engine;

performing a feedback control of the supercharge pressure by using a capacity changing means for changing the exhaust gas flow speed of the engine when the actual supercharge pressure has reached a first predetermined value after the acceleration condition is detected, said feedback control including correcting a control amount for operating the capacity changing means to control the supercharge pressure; and

increasing a first target value of the supercharge pressure

when predetermined time passes after the actual supercharge pressure reaches a second target value from said first predetermined value.

4,697,423

CONNECTING LINE BETWEEN A COMPRESSOR OF AN EXHAUST GAS TURBOCHARGER FLANGEDLY CONNECTED AT AN EXHAUST GAS MANIFOLD OF AN INTERNAL COMBUSTION ENGINE AND A SUCTION PIPE

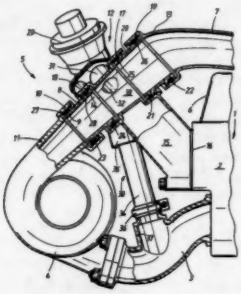
Ulrich Conrad, Ludwigsburg; Michael Grohn, Waiblingen, and Peter Moser, Weinstadt, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,074

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1985, 3529543

Int. Cl.[4] F02B *37/00*

U.S. Cl. 60—605 **16 Claims**



1. A connecting line between a compressor of an exhaust gas turbocharger flangedly connected at an exhaust gas manifold of an internal combustion engine and a suction pipe, comprising a first line part secured at the suction pipe and a second line part which is coupled with the exhaust gas turbocharger and the first line part by coupling means arranged at the pipe ends to be connected with each other in an angular and axial tolerance-compensating manner, and line bridge means arranged between the first and second line part, said line bridge means being fixedly arranged at the internal combustion engine, said line bridge means including at its longitudinal pipe ends coupling sections for the separate connection of the coupling sections at both line parts, and said line bridge means being provided between the two coupling sections with a mixing space having an overflow opening for the admixture of exhaust gas to the combustion air.

4,697,424

POWER GENERATION SYSTEM

Clifford Dickerson, Riverside, and David Keithly, Los Angeles, both of Calif., assignors to Temes Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 534,395, Sep. 22, 1983, abandoned, which is a continuation-in-part of Ser. No. 252,314, Apr. 9, 1981, abandoned, which is a continuation-in-part of Ser. No. 81,866, Oct. 4, 1979, abandoned. This application Jun. 20, 1985, Ser. No. 746,469

Int. Cl.[4] F01K *21/00*

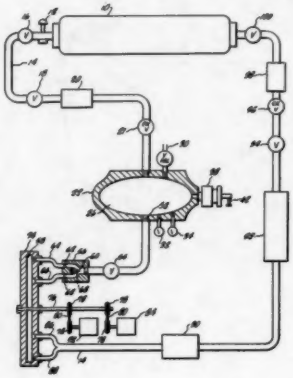
U.S. Cl. 60—670 **11 Claims**

1. A power generation system wherein a fluid is heated by a microwave frequency to produce motive power, said system having:

(a) tank means for providing a reservoir for said fluid;

(b) boiler means, in fluid communication with said tank means, for heating said fluid, said boiler comprising a substantially elliptically shaped chamber having a longitudinal dimension twice its latitudinal dimension and having a stainless steel liner to which a heat grid is attached to the exterior thereof;

(c) means attached to said boiler for generating a microwave frequency and imparting same to said boiler to heat said fluid;



(d) means for converting energy of said heated fluid to motive power, said means in fluid communication with said boiler means;

(e) condensor means, in fluid communication with said energy conversion means, for cooling said fluid, said condensor means also in fluid communication with said tank means; and

(f) control means for monitoring and controlling the flow and function of fluid throughout the system.

4,697,425

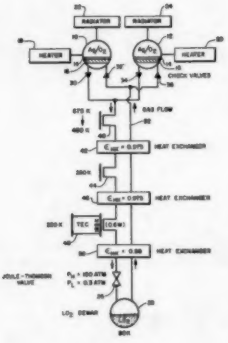
OXYGEN CHEMISORPTION CRYOGENIC REFRIGERATOR

Jack A. Jones, Los Angeles, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 24, 1986, Ser. No. 855,982

Int. Cl.[4] F17C *11/00*

U.S. Cl. 62—48 **15 Claims**



1. A cryogenic refrigeration system, comprising:

first and second containers;

an absorbent material located in each container which reversibly chemically reacts with oxygen, wherein in a first reaction oxygen is chemically absorbed by the material and in a second reaction previously absorbed oxygen is desorbed from the material at a relatively high pressure, wherein the first reaction occurs at a temperature below the second reaction;

control means for causing the first and second reactions to alternately occur in each container so that when the first reaction is occurring in one container the second reaction is occurring in the other container, thereby to provide a continuous supply of high pressure oxygen;

an expansion valve for receiving high pressure oxygen from the containers and partially liquefying it;

a vessel for receiving oxygen from the expansion valve; and

a conduit coupling the vessel to the containers, wherein liquid oxygen in the vessel is boiled to provide gaseous oxygen to the containers.

4,697,426

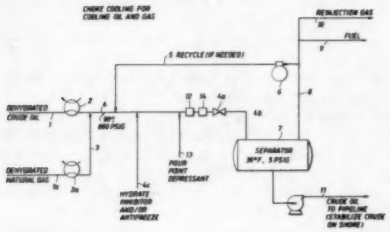
CHOKE COOLING WAXY OIL

William T. Knowles, Jr., Houston, Tex., assignor to Shell Western E&P Inc., Houston, Tex.

Filed May 29, 1986, Ser. No. 868,919

Int. Cl.[4] F17C *11/00*

U.S. Cl. 62—48 **28 Claims**



1. A process for pipelining a waxy oil having a gas dissolved therein to essentially eliminate deposition of wax on the pipeline wall, comprising:

forming a pressurized mixture of said waxy oil with a gas dissolved therein and an additional gas;

effecting a sudden pressure drop of said mixture of the waxy oil and the gas, thereby expanding a substantial portion of the gas to chill the oil and forming a slurry of wax particles and oil; and

pipelining the slurry.

4,697,427

FORCED FLOW EVAPORATOR FOR UNUSUAL GRAVITY CONDITIONS

Richard E. Niggemann, Rockford, Ill., and Wilbert E. Ellis, Friendswood, Tex., assignors to Sundstrand Corporation, Rockford, Ill.

Filed May 10, 1985, Ser. No. 732,874

Int. Cl.[4] F25D *15/00*

U.S. Cl. 62—119 **15 Claims**

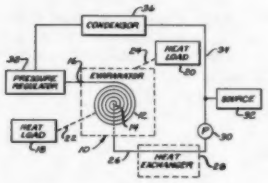
1. A cooling system for zero or high gravity application comprising:

an evaporator including a generally spirally wound, plural convolution conduit having an inlet and an outlet;

a pair of thermally conductive plates sandwiching said conduit and in heat transfer relation therewith;

means on each of said plates oppositely of said conduit for securing components to be cooled to said plates on both sides of said conduit;

means for introducing a coolant in the liquid phase or a mixture of liquid and vapor phases into said inlet and for causing said coolant to flow through said conduit toward said outlet while evaporating some or all of said liquid phase so that the coolant emerges from the outlet in the vapor phase or as a mixture of liquid and vapor phases; and



means associated with said conduit for controlling the pressure of the coolant therein to thereby set the saturation temperature of the system.

4,697,428

DEVICE FOR CONCENTRATING SOLUTIONS

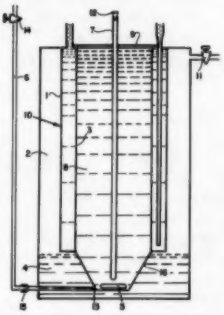
Henri M. Ruijten; Hans De Bree, and Peter H. Van Amsterdam, all of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Mar. 20, 1986, Ser. No. 841,630

Claims priority, application Netherlands, Mar. 25, 1985, 8500859

Int. Cl.[4] B01D *9/04*

U.S. Cl. 62—124 **9 Claims**



1. A device for concentrating a solution by partly freezing out a solvent, said device comprising:

(a) a vessel for containing said solution;

(b) an insulating cooling jacket surrounding said vessel except at a lowermost portion of said vessel;

(c) said vessel comprising (i) a stirring means for stirring the solution in the vessel, and (ii) a bottom portion including a draining aperture for draining the solution after concentration thereof has been completed, said stirring means and said draining aperture being positioned at said lowermost portion of said vessel; and

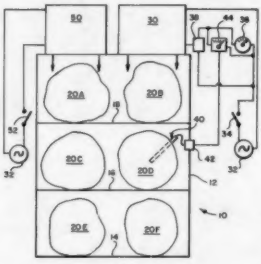
(d) a heating medium disposed externally of said vessel at said lowermost portion of said vessel for heating only said solution at said lowermost portion of the vessel.

4,697,429

RAPID CHILL REFRIGERATOR CONTROL

Michael S. Chandler, and R. Charles Fiddler, both of Parsons, Tenn., assignors to Kolpak Industries, Inc., Parsons, Tenn.

Filed Sep. 6, 1985, Ser. No. 773,187
Int. Cl.[4] F25B *1/00*
U.S. Cl. 62—203 2 Claims



1. A rapid chill refrigerator system for lowering the temperature of a batch of heated food to a desired temperature and then maintaining said batch of food at substantially the desired temperature comprising:

a cabinet for holding a batch of food initially in a heated condition following cooking,

a maintenance refrigeration system for cooling the contents of the cabinet,

a chill refrigeration system for cooling the contents of the cabinet,

product temperature probe means for generating a signal indicative of the temperature of the interior of a product being cooled in said refrigerator,

means for supplying current to said refrigeration systems, and

control circuit means for controlling the supply of current to said chill refrigeration system from said supply means comprising:

(a) means for disconnecting said chill refrigeration system from said supply means, and

(b) means for operating said disconnecting means comprising:

(i) an adjustable timer connected to said disconnecting means for operating said disconnecting means after a selected time,

(ii) temperature control means for operating said disconnecting means upon receiving a signal indicative of a predetermined temperature from said probe means, said temperature control means connected to said disconnecting means and in parallel with said timer, and

(iii) means for connecting said temperature control means to said probe means comprising means for selectively preventing a signal indicative of the temperature of a said product from reaching said temperature control means,

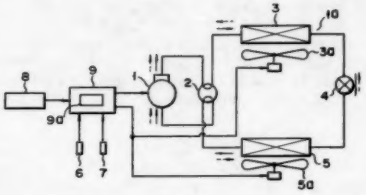
(iv) said adjustable timer and said temperature control means being the only elements connected to said operating means.

4,697,430

AIR CONDITIONER WITH A RADIANT TEMPERATURE CONTROL

Keiji Toyoda, and Sei Suma, both of Fuji, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 30, 1986, Ser. No. 868,682
Claims priority, application Japan, May 31, 1985, 60-118127; Sep. 30, 1985, 60-216849
Int. Cl.[4] G05D *23/00*
U.S. Cl. 62—209 5 Claims



1. An air conditioner with a radiant temperature control comprising:

a refrigeration cycle for air-conditioning a room at a desired temperature;

temperature setting means for setting the desired temperature at a target value;

first temperature sensor means for detecting an air temperature of the room;

second temperature sensor means for detecting a radiant temperature of the room;

control means for receiving the target value from said temperature setting means and the air temperature from said first temperature sensor means and for outputting an operation control signal to said refrigeration cycle in accordance with a difference between said target value and said air temperature; and

correcting means for receiving the target value from said temperature setting means and the radiant temperature from said second temperature sensor means, and when a difference therebetween deviates from a predetermined value, correcting the target value from said temperature setting means in accordance with a deviation of the difference between the target value and the radiant temperature from the predetermined value.

4,697,431

REFRIGERATION SYSTEM HAVING PERIODIC FLUSH CYCLES

Richard H. Alsenz, 2402 Creekmeadows, Missouri City, Tex. 77459

Continuation-in-part of Ser. No. 639,271, Aug. 8, 1984, Pat. No. 4,651,535. This application Jun. 30, 1986, Ser. No. 880,288
Int. Cl.[4] F25B *41/04, 31/00*
U.S. Cl. 62—225 18 Claims

1. A refrigeration system comprising:

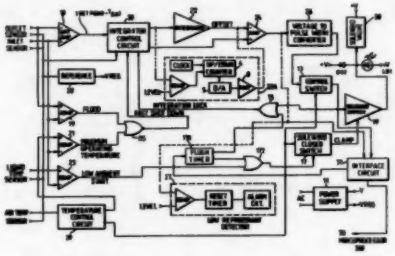
(a) compressor means having an inlet and an outlet end;

(b) a condenser means connected to the outlet end of said compressor means and responsive to a high pressure gaseous phase recirculating refrigerant for condensing the refrigerant from its gaseous to its liquid phase;

(c) an evaporator means having an inlet and an outlet end connected to the outlet end of said condenser means and to the inlet end of said compressor means, respectively;

(d) said evaporator means having an associated solenoid-actuated expansion valve having an inlet and an outlet end connected between the outlet end of said condenser means, and the inlet end of said evaporator means, said condenser means delivering high pressure liquid refrigerant to the inlet end of said expansion valve, said refrigerant expanding as it flows through said expansion valve;

(e) said solenoid-actuated valve including an associated on-off modulator responsive to the instantaneous superheat of said refrigerant in said evaporator means for generating a variable duty cycle on-off modulated solenoid control signal, said solenoid control signal alternatively energizing and de-energizing said associated solenoid-actuated valve for each cycle of said control signal to cycle said valve from a first flow rate position to a second flow rate position without imparting shock waves to the refrigerant thereby to obtain an average flow rate of refrigerant through the valve which results in a desired



superheat for the refrigerant in said evaporator means, said valve further including a flush cycle timer means for generating a flush cycle having a time interval during which said associated expansion valve is controlled to permit full flow therethrough to fill said associated evaporator means with liquid refrigerant; and

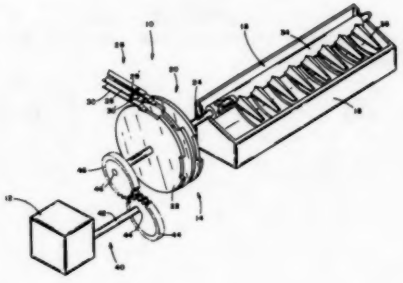
(f) control means for periodically initiating flush cycles for said expansion valve whereby said valve is opened for full flow therethrough during the flush cycle so that said evaporator means is flushed of compressor lubricant oils which may have accumulated therein.

4,697,432

ICE MAKER SYSTEM

Ronald E. Cole, Greenwood, Ind., assignor to Emhart Industries, Inc., Indianapolis, Ind.

Filed Jul. 24, 1986, Ser. No. 888,875
Int. Cl.[4] F25C *5/04*
U.S. Cl. 62—233 **1 Claim**



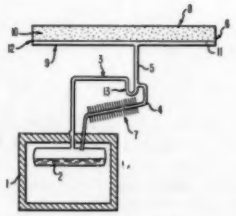
1. A timed drive means for an ice making system comprising:
cam means and switch means operated by said cam means,
ice removal means,
a motor, and
coupling means coupling said motor to said ice removal means to operate same, including a motor output shaft connected to a first elliptical gear through a first foci of same, and a second elliptical gear meshing with said first elliptical gear and connected to said ice removal means through a second foci of same,
said first and second elliptical gears programmed such that said first foci is toward the area where they mesh, and said second foci is away from said area during ice removal, and
said first foci is away from said area and said second foci is toward said area during liquid filling of said ice making system.

4,697,433

THERMAL ENERGY COLLECTOR

Gérard Paeye, Champagne sur Seine, France, assignor to Jeumont-Schneider Corporation, Puteaux, France

Filed Apr. 11, 1985, Ser. No. 721,921
Claims priority, application France, Apr. 13, 1984, 84 05866
Int. Cl.[4] A63C *19/10*
U.S. Cl. 62—235.1 **2 Claims**



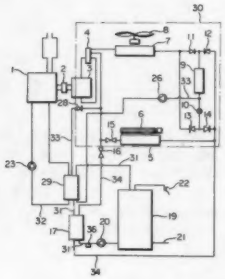
1. In a thermal energy collector for use with a solar cooling system and the like having successive operating phases in which, respectively, a fluid is adsorbed by an adsorptive-desorptive material and desorbed by said material, the collector including a compartment having a first surface to be exposed to a source of thermal energy and a second surface opposing said first surface and adapted to be connected to said system and the like by means of a duct, said material being disposed between said first and second surfaces, the improvement wherein:
said first and second surfaces are substantially parallel planar surfaces peripherally joined to one another by sidewalls of said compartment that are substantially perpendicular to said first and second surfaces,
said second surface has a generally central opening therein for connection to said duct,
said material is supported upon a perforated support surface spaced from said second surface and holding said material in contact with said first surface,
said support surface is substantially parallel to said first and second surfaces and is supported within said compartment substantially only at inner surfaces of the sidewalls of said compartment such that there is a large free space between said support surface and said second surface within said compartment, which free space is substantially coextensive with said support surface and said second surface,
said material is composed of elements of approximately 1.6 mm in cross dimension, with perforations of said support surface being of lesser cross dimension and representing about 35% of the area of said support surface, and
said material is selected from zeolite and activated charcoal, said fluid used with zeolite being water, said fluid used with activated charcoal being methanol.

4,697,434

PRIME MOVER DRIVEN AIR-CONDITIONING AND HOT-WATER SUPPLYING SYSTEM

Hiroshi Yuyama, Shizuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 16, 1986, Ser. No. 919,476
Claims priority, application Japan, Oct. 17, 1985, 60-231819; Feb. 7, 1986, 61-25431
Int. Cl.[4] F25B *27/00*
U.S. Cl. 62—238.7 16 Claims



1. An air-conditioning and hot-water supplying system comprising:

a heat pump circuit adapted to circulate heat-transmitting medium for air-conditioning the interior of a housing, said heat pump circuit including a prime mover, a compressor adapted to be driven by said prime mover, an indoor heat exchanger connected to one side of said compressor and disposed in said housing for heating or cooling air in said housing, an outdoor heat exchanger connected to the other side of said compressor and disposed outside said housing for radiating heat toward or absorbing heat from outside air, said indoor and outdoor heat exchangers being connected with each other through a receiver and a throttling means;

a prime mover cooling circuit adapted to circulate cooling water for cooling said prime mover;

a hot-water circulation circuit including a hot water tank for storing hot water, and a pump for circulating water to be stored in said hot water tank;

a heat-pump water-heating circuit connected to said heat pump circuit in a parallel relation with said indoor heat exchanger in said heat pump circuit for heating the water in said hot-water circulation circuit by means of the heat-transmitting medium in said heat pump circuit;

a heat-transmitting-medium heating circuit connected to said heat pump circuit in a parallel relation with said outdoor heater for heating the heat-transmitting medium circulating through said heat pump circuit;

a first water-heating heat exchanger disposed in said prime mover cooling circuit, in said heat-transmitting-medium heating circuit and in said hot-water circulation circuit for exchanging heat between the cooling water in said prime mover cooling circuit and the heat-transmitting medium in said heat-transmitting-medium heating circuit, and between the cooling water and the water in said hot-water circulation circuit;

a second water-heating heat exchanger disposed in said heat-pump water-heating circuit and in said hot-water circulation circuit for exchanging heat between the heat-transmitting medium in said heat-pump water-heating circuit and the water in said hot-water circulation circuit; and

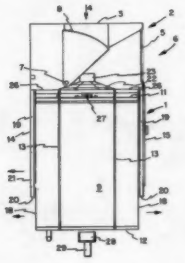
change-over means for selectively connecting one of said indoor heat exchanger and said heat-pump water-heating circuit with said compressor.

4,697,435

APPARATUS FOR HUMIDIFYING, CLEANING AND COOLING OF GASES

Rüdiger Detzer, Alten-Buseck; Werner Loew, Wetzlar, and Franz Kohnen, Giessen, all of Fed. Rep. of Germany, assignors to Kessler + Luch GmbH, Giessen, Fed. Rep. of Germany

Filed Oct. 23, 1986, Ser. No. 922,149
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1985, 3537671
Int. Cl.[4] F28D *5/00*
U.S. Cl. 62—304 14 Claims



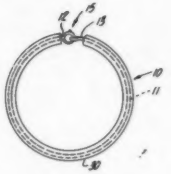
1. An apparatus for humidifying, cleaning and cooling of gases, especially air, with a filter layer disposed in the path of a gas stream to be treated and a device for supplying the gas stream with liquid, comprising: a cuboid housing with at least one upper gas inlet disposed in the upper portion of the housing for the introduction of a stream of gas to be treated by humidifying, cleaning and cooling, at least one cage having a polygonal cross section and closed at its bottom extending downwardly in the housing from a point below the upper gas inlet, a fan centrally located with respect to the cage partially covering the upper surface of the cage leaving an outer ring gap, an inner cage wall formed by a filter layer, an annular spray nozzle disposed underneath the fan for the distribution of liquid, mainly water, gas outlet openings at the lower part of the housing for the discharge of gas passing through the cage, and a space between the outer surface of the cage and the inner surface of the housing for providing an air channel for return of part of the gas passing through the cage to the outer ring gap at the fan.

4,697,436

COSTUME JEWELRY CIRCLET

Kenneth J. Schmidt, 24001 Country Squire Blvd., Apt. 204, Mt. Clemens, Mich. 48043

Filed Jan. 13, 1986, Ser. No. 817,896
Int. Cl.[4] A44C *5/00*
U.S. Cl. 63—3 10 Claims



1. A costume jewelry circlet comprising:

a core formed of a length of non-extensible material having opposite ends;

a first removable elongated, semi rigid, thin wall, tublar sleeve having a first predetermined physical characteristic and having a continuous axial opening through which said

core is inserted so that the first sleeve encircles and substantially completely covers the core along the length of the core;

a second removable elongated, semi rigid, thin wall, tubular sleeve having a second predetermined physical characteristic and having a continuous axial opening capable of insertably receiving the core therein so that the second sleeve encircles and substantially completely covers the core along the length of the core;

fastening means for disengageably connecting the opposite ends of said core to form a loosely fitting circlet having a first appearance associated with the physical characteristic of the first sleeve, said fastening means being adapted to permit removal of the core from the first sleeve, whereby the core may be inserted into the second sleeve to selectively give said circlet a second appearance associated with the physical characteristic of the second sleeve.

4,697,437

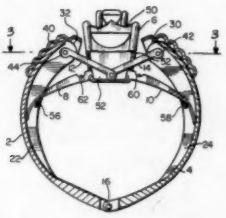
ADJUSTABLE RING STRUCTURE

Philip D'Annunzio, 3506 Lufberry Ave., Wantagh, N.Y. 11793

Filed Nov. 12, 1985, Ser. No. 796,798

Int. Cl.[4] A44C *9/02*

U.S. Cl. 63—15.5 **16 Claims**



1. An adjustable ring comprising:

a ring shank having first and second arcuate elements, each of said first and second arcuate elements having first and second end portions, said first and second arcuate elements being pivotably interconnected at one of said first and second end portions thereof to form an expansible ring shank defining an opening between another of said first and second end portions, each of said first and second arcuate elements having an interior groove adjacent to said another of said first and second end portions and extending toward said one of said first and second end portions over more than half of the arcuate element associated therewith;

an ornamental ring top, said ornamental ring top having first and second slider members, one of said first and second slider members being slideably mounted within said interior groove in each of said first and second arcuate elements and disposing said ornamental ring top in sid opening, each of said first and second slider members being arcuate and disposed to maintain contact with bottom portions of said interior groove in each of said first and second arcuate elements as said first and second slider members are disposed therein; and

first and second interconnecting arms, each of said first and second interconnecting arms being connected to said ornamental ring top and a differeing one of said another of said first and second end portions whereby said ornamental ring top is displaceable, expanding and contracting said ring shank.

4,697,438

SYNCHRONIZING DEVICE FOR THE SELECTION OF KNITTING NEEDLES IN KNITTING MACHINES

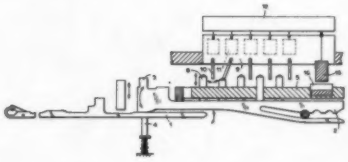
Hartwig Müller; Claus Hellwig, and Dietmar Beyer, all of Karl Marx Stadt, German Democratic Rep., assignors to VEB Kombinat Textima, Karl Marx Stadt, German Democratic Rep.

Filed Sep. 11, 1986, Ser. No. 906,915

Claims priority, application German Democratic Rep., Sep. 27, 1985, 281090

Int. Cl.[4] D04B *15/70, 15/78, 7/28*

U.S. Cl. 66—75.2 **5 Claims**



1. A synchronizing device for the selection of knitting needles in a knitting machine of the type having a needle bed and a knitting carriage circulating in one direction above the needle bed, the carriage supporting a device for selecting knitting needles in the needle bed in accordance with a desired pattern, the selecting device including a set of selection cams movable between neutral and an active position, a set of solenoids coupled to respective cams for moving the same into one of said positions, means for controlling actuation of said solenoids according to the desired pattern, a pin board including a set of selection pins arrranged between said cams, said sams in the active position thereof being engageable with assigned selection pins; a blade bed arranged on the needle bed and including a set of Jacquard-type sinking blades assigned to respective knitting needles and being controlled by said selection pins; the synchronizing device comprising a synchronizing rail of a magnetizable material supported on said pin board, said synchronizing rail being formed with a series of slots spaced in accordance with the division of knitting needles in the needle bed, the series of slots extending in the direction of movement of the carriage; sensing means arranged on the carriage opposite said slots for detecting during circulation of said carriage magnetization changes in said rail to generate corresponding analog signals; and evaluation means for generating from said analog signals corresponding synchronizing signals when said analog signals exceed predetermined values, said synchronizing signal being applied to said controlling means to trigger selected solenoids.

4,697,439

DEVICE FOR THE DISENGAGEABLE LOCKING OF THE LAST ROWS OF KNITTED FABRIC IN THE NEEDLE WORKING AREA OF AN AUTOMATIC FLAT KNITTING MACHINE

Benito Stoppazzini, Sala Bolognese, Italy, assignor to E.M.M. Emiliana Macchine Maglieria S.r.l., Bologna, Italy

Filed Aug. 12, 1986, Ser. No. 895,731

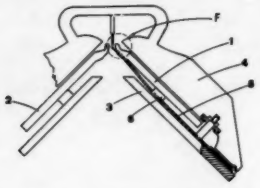
Claims priority, application Italy, Sep. 18, 1985, 3551 A/85

Int. Cl.[4] D04B *15/88*

U.S. Cl. 66—149 R **6 Claims**

1. A device for the disengageable locking of the last rows of knitted fabric in the needle working area of an automatic flat knitting machine, said machine consisting of at least one needle bed with a carriage, the former featuring equidistant slots perpendicular to the carriage traversing direction in which there are inserted, from top to bottom, a needle and a sinker which has the task, if selected by corresponding selection means mounted on said carriage, of raising a corresponding needle; there are also means on the carriage to cause the opera-

tion of the raised needles, and means to return the needles to their rest position following upon their operation; said device including: a quantity of equidistant rods, located below the needle bed, perpendicular to the carriage traversing direction, supported by the machine frame and axially guided by guide means, the upper ends of which these rods are bent towards the upper head of the needle bed in the area of the needle bed where the last rows of the fabric being made are present; means located on said carriage to control the rods and move them to two extreme positions, the portion of last rows of fabric, under the working area of the needles, being locked by said upper



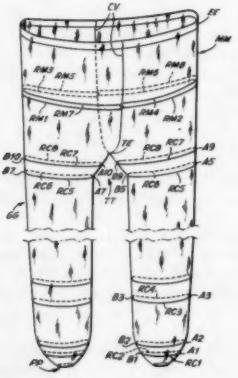
end of said rods when these latter are in the first position, and said portion being disengaged from said upper end of said rod when these latter are in the second position; a minimum of two fabric presser plates, mounted on said carriage, and located above the upper head of the needle bed and parallel to the same and situated on both sides of the needle working area, moving vertically and subjected to spring acting in a downward direction, said fabric presser plate located downstream from the working area of the needles having the task of compressing the last row of fabric just knitted according to the established pressure.

4,697,440

METHOD AND MACHINE FOR KNITTING GARMENTS HAVING LEGS AND A BODY PORTION

Ivan Riccitelli, Lucca, Italy, assignor to Conti Paoli & Meritex S.r.l., Italy

Continuation-in-part of Ser. No. 651,605, Sep. 17, 1984, Pat. No. 4,608,840. This application Apr. 11, 1986, Ser. No. 850,766
Claims priority, application Italy, Sep. 20, 1983, 9518 A/83
Int. Cl.[4] A41B *9/00*
U.S. Cl. 66—177 **9 Claims**



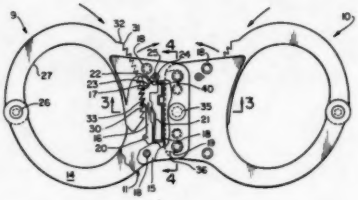
6. A garment such as a pair of tights comprising: a body having a front portion and a rear portion; two tubular legs; two corresponding toes of single layer fabric with rows of knitted loops which increase gradually from the toe to the leg, the knitted loops of each leg extending away from the toe; at the upper end of the legs, rows longer than those which formed the two legs, to form a crotch adjacent to the body; said body being made of pairs of partial rows forming the right and the left portions, respectively, of the front portion and the rear portion of the body portion, which right and left portions are divided by a corresponding dividing line therebetween, and which rows are mutually engaged in a connecting zone with at least one wale of knitted loops developed at the dividing line between the right and left portions of the body and formed with the two yarns of the contiguous rows of said two right and left portions of the body, the number of loops in each of the rows of the right and left portions being constant along the body.

4,697,441

HANDCUFFS

Mark L. Allen, 1776 E. 13th St., Brooklyn, N.Y. 11229

Filed Nov. 6, 1986, Ser. No. 928,308
Int. Cl.[4] E05B *75/00*
U.S. Cl. 70—16 **4 Claims**



1. A pair of handcuffs comprising a first handcuff and a second handcuff, wherein each handcuff includes a lock section having a spring loaded bolt member with ratchet means formed thereon, a pair of fixed spaced apart arcuate arms depending from said lock section and provided with a pivot at the end thereof remote from said lock section, and an arcuate shackle member rotatably supported on said pivot for 360 degree rotation past said lock section and between said spaced apart arcuate arms, said shackle member having a series of ratchet teeth formed at the free end thereof for cooperation with the ratchet means formed on said bolt member, pivot pin means connecting said first handcuff to said second handcuff in an offset relationship, said pivot pin means passing transversely throught the lock section of each handcuff so that the lock section of one handcuff partially overlays the lock section of the other handcuff when the handcuffs are in an edge to edge relationship and ready for use and one handcuff can be pivoted in the plane of the handcuff to overlayp the other handcuff when the handcuffs are to be stored, and detent means for limiting the movement of one handcuff relative to the other to aproximately 180 degrees from an overlapping relationship to an edge to edge relationship ready for use and vice versa, wherein said detent means comprises a member depending from one handcuff lock section, said member abutting one part of the lock section of the other handcuff when the handcuffs are in an overlapping relationship and another part of the lock section of the other handcuff when the handcuffs are in an edge to edge relationship,

4,697,442

LOCK

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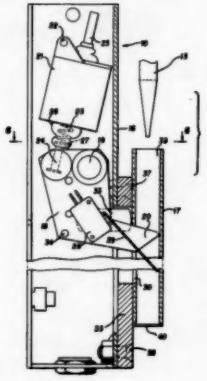
PCT No. PCT/SE82/00335, § 371 Date Jun. 20, 1983, § 102(e) Date Jun. 20, 1983, PCT Pub. No. WO83/01478, PCT Pub. Date Apr. 28, 1983
Continuation of Ser. No. 514,821, Jun. 20, 1983, abandoned.
This PCT application Oct. 18, 1982, Ser. No. 864,759
Claims priority, application Sweden, Oct. 19, 1981, 8106166
Int. Cl.[4] E05B 65/08
U.S. Cl. 70—97 15 Claims



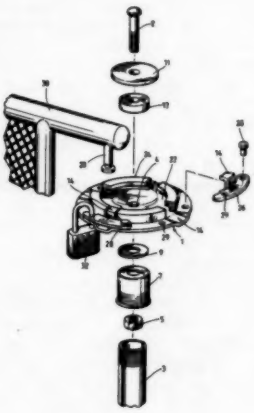
1. A locking device for vertically moving sliding gates which travel within a frame, comprising a lock mechanism including a lock housing and a lock bar, said lock housing including a sleeve having a closed end and an opposed opening oriented toward said lock bar and being arranged to receive the lock bar, the lock mechanism bridging a space between and adjacent to an edge of the gate positioned in the direction of movement of the gate and being substantially parallel to an adjacent edge of the frame, said sleeve being positioned on a projection extending from the edge of the frame and said lock bar being positioned on a projection extending from the adjacent edge of the gate, the edges of said frame and said gate maintaining a substantially fixed separation distance throughout movement of the gate, said housing have a latch, said latch being resiliently urged into a position protruding into said sleeve and being of a construction sufficient to permit said lock bar to enter said opening in said sleeve thus permitting closing of said gate, and simultaneously limiting extraction of said lock bar from said sleeve thus limiting opening of said closed gate, said latch protruding into said sleeve in a direction substantially perpendicular to the direction of locking engagement with the lock bar, wherein said sleeve includes a mouth having sides which are tubular at least along an inner surface thereof, and said lock bar having a collar which, when the gate is moved vertically downward, the lock bar is moved along a substantially vertical path generally parallel to the frame and said sleeve for insertion into said sleeve, said lock bar embracing all of said sides of said mouth of said sleeve and extending at least a short distance beyond said sides of said sleeve, and, along with said closed end of said sleeve, prevents insertion of a tool into said sleeve for pushing aside said latch.

4,697,443

MULTI-LOCK SECURITY DEVICE

Wilbert L. Hillin, Rte. 3, Box 157, Buna, Tex. 77612

Filed Feb. 3, 1987, Ser. No. 10,205
Int. Cl.[4] E05B 65/14
U.S. Cl. 70—121 11 Claims



1. A multiple lock security device comprising:
a mounting axis;
a gate pin or latch having a broadened or flanged free end such as to slidably fit within a latch race;
a locking plate rotatably mounted on said mounting axis, the locking plate having one or more radially formed access channels provided therein to accommodate the gate pin;
a locking ring or bracket attached or formed at the free end of the mounting axis and above the open side of the locking plate, the locking ring forming the inner diametrical boundary of a latch race and further serving to restrict the movement of the gate pin in the latch race in all planes other than that substantially parallel to the locking plate;
one or more fastening gates pivotally mounted on the locking plate and positioned whereby they may be closed across the access channels; and
a retaining rib connected to or formed on the locking plate, whereby the rib forms the outer diametrical boundary of the latch race and further aids to restrict the movement of the gate pin in all planes except that substantially parallel to the locking plate.

4,697,444

SECURITY DEVICE FOR TRAILER

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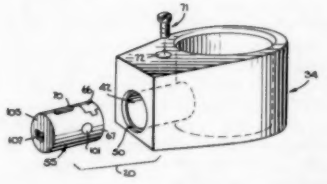
Filed Dec. 4, 1985, Ser. No. 805,122
Int. Cl.[4] F16B 41/00
U.S. Cl. 70—232 22 Claims



1. A security device lockable to a vehicle coupling pin for preventing unauthorized use of the vehicle to which the coupling pin is attached, the security device comprising a body

having a cavity therein configured to receive a coupling pin, a first hole in the body communicating with the cavity and with the exterior of the body, and a locking device comprising an enclosure which is slidably disposed in the first hole, the enclosure having a first opening at one end which faces the exterior of the body and a second opening at an opposite end which faces the cavity, a key actuable lock cylinder having a locked condition and an unlocked condition disposed in the enclosure, the lock cylinder having an entrance at an end thereof facing the exterior of the body for receiving a key by means of which the lock cylinder is actuable to its locked and unlocked conditions, the one end of the enclosure substantially covering the key entrance end of the lock cylinder and the first opening permitting passage of a key therethrough and rotation of a key therein, the lock cylinder and the first and second openings to the enclosure being sized and configured so that the lock cylinder is selectively removable from the enclosure only through its second opening, the security device including means for selectively preventing removal of the enclosure from the first hole and means actuable by the lock cylinder for causing engagement between the locking device enclosure and the body to prevent movement between the enclosure and the body in the locked condition of the lock cylinder and permitting movement between the enclosure and the body in the unlocked condition of the lock cylinder, the enclosure or means attached thereto or forming part thereof engaging a coupling pin disposed in the cavity when the lock cylinder is in its locked condition.

4,697,445

POLY-V PULLEY FORMED OF SHEET METAL AND METHOD AND APPARATUS FOR MAKING SAME

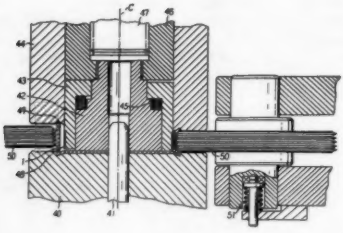
Haruma Tanaka, and Yasuo Ohashi, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 708,350, Mar. 5, 1985. This application Mar. 7, 1986, Ser. No. 837,534

Claims priority, application Japan, Mar. 7, 1984, 59-42000

Int. Cl.[4] B21H *1/04*

U.S. Cl. 72—68 **12 Claims**



1. A method of forming a poly-V pulley from a cup-shaped sheet metal work piece of substantially uniform wall thickness having a cylindrical wall portion, comprising the steps of axially compressing the cylindrical wall portion while supporting substantially the entire circumference of the internal and external surfaces of the cylindrical wall portion to prevent buckling and allowing controlled radial expansion of at least one surface to cold form a thickened central portion of the cylindrical wall portion and maintain substantially the same thickness of the axial ends of the cylindrical wall portion on either side of the central portion, and roll forming the thickened cylindrical wall portion to simultaneously form poly-V grooves on the external surface and axially extending convexes and concaves on the internal surface.

4,697,446

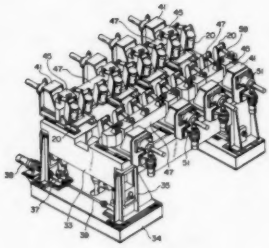
ROLL FORMING APPARATUS

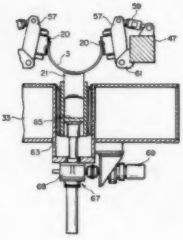
Yoshun Yamamoto; Hitoshi Okubo, both of Kitakyushu; Yutaka Watanabe, Tokai; Eizo Uchiyama, and Yutaka Yasunaga, both of Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Aug. 15, 1985, Ser. No. 765,957

Int. Cl.[4] B21D *5/12;* **B21C** *37/08*

U.S. Cl. 72—178 **17 Claims**





1. A roll forming apparatus for gradually bending a metal sheet into a desired shape using forming rolls disposed along and on both sides of a forming pass line which comprises:

an elevatable base which extends in a longitudinal direction and through which a vertical plane passes which is parallel to said longitudinal direction and contains a forming pass line about which the metal sheet is formed;

means for moving said base up or down in a vertical direction to thereby adjust the height and/or slope of said forming pass line;

at least one pair of carriages, each one of said pair of carriages being movably mounted on said base on opposite sides of said vertical plane so that the carriages move integrally with the base in the vertical direction, said pair of carriage being movable horizontally in a direction perpendicular to said vertical plane;

at least three side rolls rotatably mounted on each of said at least one pair of carriages, each of said side rolls having a roll surface for defining a forming pass;

two side roll position adjusting mechanisms spaced apart in said longitudinal direction and connected between each of said carriages and said base, each of said side roll position adjusting mechanisms being individually adjustable for moving a respective carriage horizontally and orienting said side rolls into a desired position with respect to said vertical plane whereby the metal sheet can be formed into the desired shape; and

means for reducing the distance between a top surface of said base and a point of contact between each of said side rolls and the metal sheet formed by said side rolls, said means comprising at least one bearing pedestal movably mounted below the top surface of said base, a bottom roll rotatably supported on said bearing pedestal, said bottom

roll having an upper roll surface for defining the forming pass together with said side rolls and a bottom roll position adjusting mechanism connected between said base and said bearing pedestal for moving said bearing pedestal vertically with respect to said base whereby displacement of said side rolls during forming of the metal sheet is reduced and overall rigidity of said roll forming apparatus is improved.

4,697,447

PLUG DRAWING OF TUBES AND OTHER HOLLOW ITEMS

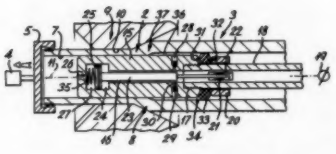
Dennis H. Sansome, West Midlands, and Gerald M. Jones, Bewdley, both of England, assignors to National Research Development Corporation, London, England

Filed Jan. 21, 1986, Ser. No. 820,728

Claims priority, application United Kingdom, Jan. 22, 1985, 8501573

Int. Cl.[4] B21C *1/24*

U.S. Cl. 72—283 **8 Claims**



1. A tube drawing plug for use in the plug drawing of tube or other elongated stock of hollow section through a die in the presence of lubricant, said hollow stock presenting an inner and outer surface, along a predetermined drawing axis and comprising:

first and second parts movable relatively to each other in opposite first and second directions along said drawing axis, one of said first and second parts having a drawing nose which determines the bore of said stock after said drawing, and upon which said inner surface of said stock converges to make contact in the course of said drawing;

a deformable annular sealing member separate from but associated with said first and second parts and having a deformed state and a relaxed state, and when in said relaxed state permitting easy insertion of said plug into said stock prior to said drawing;

said deformable annular sealing member when in its said deformed state being adapted to seal a substantial annular clearnace between said plug and said inner surface of said undrawn part of said stock as drawing takes place;

anchoring means on said or said part of said plug having said drawing nose and operable in use to anchor said first part of said plug axially relative to said die;

said second part of said plug having means to respond to forces generated by the operation of said plug drawing by executing said movement in said first direction relative to said anchored first plug part;

said relative movement of said first and second parts in said first direction serving to deform said sealing member into its said deformed state, and in said second and opposite direction to permit said sealing member to relax to its said relaxed state.

4,697,448

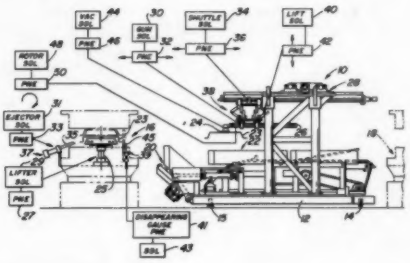
CONTROL SYSTEM FOR TRANSFER APPARATUS

Raymond R. Stevens, Jr., Vincentown, N.J.; Robert R. Beisel, Sharon Hill, and Stephen F. Griffiths, Philadelphia, both of Pa., assignors to The Budd Company, Troy, Mich.

Continuation of Ser. No. 586,386, Mar. 5, 1984, abandoned. This application Oct. 8, 1986, Ser. No. 917,117

Int. Cl.[4] B21J *13/08*; B65G *43/00*

U.S. Cl. 72—405 **14 Claims**



1. In a manufacturing system

a. a transfer machine for performing different independent operations including gripping, moving, rotating, lowering and lifting a component,

b. a source of electrical power;

c. a plurality of solenoids to receive power from said power source to control the start and stop times of said operations in said transfer machine;

d. first normally open and second normally closed serially connected electrical contacts connected between said source of power and each of said solenoids to permit power to be applied to said solenoids when said first and second contacts are closed to start said operations;

e. first and second timing relays having adjustable means for controlling the opening and closing of said first and second electrical contacts,

f. means for connecting said source of power simultaneously to all of said first and second relays, and

g. said first timing relay being operative to close said first normally open contacts to connect said source of power to said solenoids to start said operations in said transfer machine and said second timing relay being operative to open said normally closed contacts to disconnect said solenoids from said source of power to stop said operations in said transfer machine.

4,697,449

SHIFTABLE WORKPIECE GRIPPER FOR A MULTI-STAGE PRESS

Erich Harsch, Weingarten, and Reiner Reichenbach, Unterankenreute, both of Fed. Rep. of Germany, assignors to Maschinenfabrik Müller-Weingarten AG, Weingarten, Fed. Rep. of Germany

Filed Mar. 5, 1986, Ser. No. 836,627

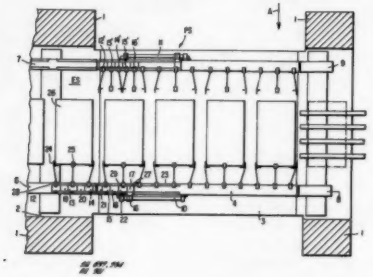
Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3507676

Int. Cl.[4] B21J *13/08*

U.S. Cl. 72—405 **3 Claims**

1. In a multi-stage press including support columns; a press stage including tools for deforming a workpiece; an empty stage adjoining said press stage in a direction of a length dimension of said multi-stage press and being situated in a zone of the support columns; said empty stage being void of tools; a gripper rail extending through said press stage and said empty stage; said gripper rail being formed of a first gripper rail length portion situated in said press stage and a second gripper rail length portion situated in said empty stage; a plurality of workpiece gripper assemblies mounted on said gripper rail; and

a tool table normally situated in said press stage and being arranged for removal from said press stage in a direction transversely to said length dimension; said tools and said first gripper rail length portion being mounted on said tool table for displacement therewith as a unit; the improvement wherein said workpiece gripper assemblies are independently shiftable relative to one another along said gripper rail and the workpiece gripper assemblies normally supported on said second gripper rail length portion are shiftable onto said first gripper rail length portion; said workpiece gripper assemblies having a normal operating position in which said workpiece gripper assemblies are situated on said first and second gripper rail length portions in a mutually spaced relationship with respect to one another; said workpiece gripper assemblies having a replacement position in which said workpiece gripper assem-



blies are situated solely on said first gripper rail length portion in a mutually contacting relationship with repsect to one another; the improvement further comprising a power means situated in said press stage; an abutment bar connected to said power means and to one of said workpiece gripper assemblies being farthest from said power means, whereby said farthest workpiece gripper assembly pushing all said workpiece gripper assemblies together and onto said first gripper rail length portion by a force exerted by said power means on said abutment bar; a plurality of abutments secured to said gripper rail and being spaced from one another parallel to said length dimension; said abutments being arranged in a step-like offset series; and further wherein each said workpiece gripper assembly has a stop cooperating with a respective said abutment for determining normal working positions for each said workpiece gripper assembly on said gripper rail.

4,697,450

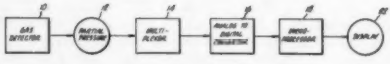
GAS MONITOR HAVING TREND INDICATORS

Thomas E. Bachman, San Clemente; Larry S. McDavid, Anaheim, and David M. Trueblood, Whittier, all of Calif., assignors to Sensormedics Corporation, Anaheim, Calif.

Continuation of Ser. No. 712,260, Mar. 15, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 946,685

Int. Cl.[4] G01N *7/10*

U.S. Cl. 73—23 **3 Claims**



1. A cutaneous gas monitor system comprising:

means for sampling a gas mixture;

means for determining a substanially current partial pressure of a constituent gas in the gas mixture;

means for recording a series of stored partial pressures;

means for adjustably selecting a historical value using the series of stored partial pressures;

means for inputting at least one adjustably selected reference value to the monitor;

means for comparing the current partial pressure, the historic value and the selected reference value to determine when the trend of the current partial pressure as a function of time exceeds the selected reference value;

a display means for signalling the trend of the current partial pressure when the trend as a function of time exceeds the selected reference value.

4,697,451

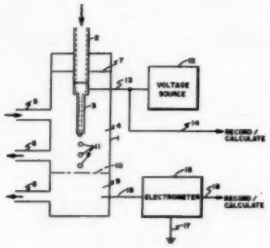
AUTOMATED INTERFACIAL TENSIOMETER

Michael J. Matteson, Decatur, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Continuation-in-part of Ser. No. 606,289, May 2, 1984, Pat. No. 4,569,226. This application Sep. 26, 1985, Ser. No. 779,680 The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

Int. Cl.[4] G01N *13/02*

U.S. Cl. 73—64.4 **6 Claims**



1. The method of determining the interfacial tension in a liquid-liquid system in which one liquid has a greater density than the other, which comprises the steps of:

(a) forming a body of said one liquid which is of greater density;

(b) introducing said other liquid which is of lesser density dropwise into said one liquid at a rate which may be estimated;

(c) imparting a total electrical charge Q_T on each drop of said other liquid by the application of voltage V and varying such voltage so that some drops carry charges which are different from the charges of other drops;

(d) measuring the frequency f of the drops and the total electrical charge Q_T carried by each drop;

(e) determining the values of the interfacial tension γ for different V and measured f and plotting γ vs V^2 therefrom;

(f) determining the value of the capacitance C per unit area per drop from the slope of the plot of step (e) and calculating the value of actual flow rate q' based upon the value of C, f, V and Q_T; and

(g) repeating steps (a) through (e) until the estimated liquid flow rate of step (b) equals q'.

4,697,452

APPARATUS FOR TESTING THE LEAKTIGHTNESS OF FILLED, CLOSED PACKAGES OF FLEXIBLE MATERIAL

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Filed Apr. 25, 1986, Ser. No. 855,737

Claims priority, application Netherlands, May 9, 1985, 8501336

Int. Cl.[4] G01M *3/00*

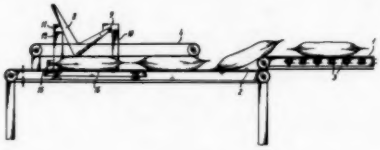
U.S. Cl. 73—49.3 **9 Claims**

1. An apparatus for moving a series of filled and closed packages which are made of a flexible material along a path

and for detecting whether there are leaks in any of the packages, said apparatus comprising:

a conveyor means for supporting said series of filled and closed packages and moving them along a path,

first and second pressure belts which are positioned to simultaneously press at least one of said packages towards and against said conveyor means as said packages are moved



by said conveyor means along said path, said first and second pressure belts being spaced apart to provide a gap therebetween, and

first sensing means located in said gap to determine the degree of expansion of each package which is compressed by said first and second pressure belts and thus detect whether any of said packages have leaks therein.

4,697,453

APPARATUS FOR MONITORING BURDEN DISTRIBUTION IN FURNACE

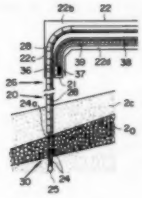
Shigemi Murakawa; Seiji Taguchi; Makoto Nomura; Ryoji Takabe; Yoshiharu Iwashita, and Masahiro Ishii, all of Chiba, Japan, assignors to Kawasaki Steel Corp., Hyogo, Japan

Filed Jul. 2, 1985, Ser. No. 751,088

Claims priority, application Japan, Jul. 5, 1984, 59-137868; Jul. 6, 1984, 59-140340

Int. Cl.[4] G01F *23/00*; C21B *7/24*

U.S. Cl. 73—290 R **30 Claims**



1. An apparatus for monitoring burden distribution in a furnace comprising:

a hollow elongated cylindrical sonde having one end for insertion into an internal space of said furnace,

means associated with said sonde for shifting the position of said one end radially inward and outward with respect to the center of said furnace;

a burden distribution monitoring sensor for monitoring burden distribution in the upper region of said furnace and producing a signal indicative of monitored burden distribution, said sensor extending through said sonde and movable along the latter and having a working end for monitoring burden distribution, which working end extends from said one end of said sonde and is adapted to be radially displaced according to the displacement of said one end of said sonde relative to said center of said furnace; and

data processing means associated with said sensor for receiving said burden distribution indicative signal for deriving burden distribution indicative data based thereof.

4,697,454

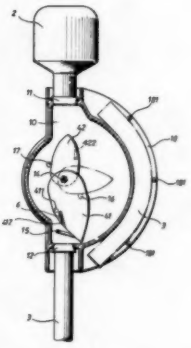
COMBINED HYDROMETER FOR TESTING THE BATTERY AND RADIATOR FLUID

Shwu-Ching Lu, P.O. Box 32-223, Taipei, Taiwan

Filed Nov. 26, 1985, Ser. No. 801,967

Int. Cl.[4] G01N *9/16*

U.S. Cl. 73—440 **4 Claims**



1. A combined hydrometer for mesuring the specific gravity of a radiator fluid and a battery fluid comprising a fluid chamber having a transparent front window, a substantially horizontal axis in said chamber, a plurality of calibrated scales on a front surface portion of said window, a plurality of floats each of which is mounted eccentrically in said fluid chamber for pivotal movement about said axis, said scales including a lower scale having readings calibrated for the freezing temperature of a radiator fluid and an upper scale having readings corresponding to specific gravity values of a battery fluid, said floats including an indicator float and a second float, said indicator float having a relatively smaller specific gravity than said second float and being mounted on said axis between said second float and said front window, said indicator float normally resting with an end thereof towards a lowermost point of said radiator fluid scale, said second float normally resting with an end thereof towards a lowermost point of said battery fluid scale, carrying means associated with said indicator float and said second float for carrying said second float along with said indicator float when said indicator float is angularly deflected about said axis beyond the resting position of said second float, whereby when said fluid chamber is filled with radiator antifreeze fluid said indicator float will be floated thereby to angularly deflect about said axis to indicate a reading within the radiator fluid scale so as to measure the specific gravity or the freeze temperature of said radiator antifreeze fluid, and when said fluid chamber is filled with battery fluid said indicator float will be floated thereby to angularly deflect about said axis into the battery fluid scale whereupon said carrying means effects pivotal movement of said second float therewith to indicate a reading within the battery fluid scale so as to measure the specific gravity of said battery fluid.

4,697,455

ACCELEROMETER COIL MOUNTING SYSTEM

Brian L. Norling, Mill Creek, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Apr. 16, 1986, Ser. No. 853,153

Int. Cl.[4] G01P *15/13*

U.S. Cl. 73—497 **9 Claims**

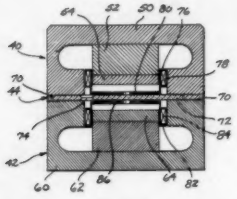
1. An accelerometer, comprising:

a proof mass assembly including a reed suspended from a support for movement with respect thereto;

a coil having a generally cylindrical shape; and

a mounting system for mounting the coil to the reed, the

mounting system comprising at least three mounting means, each mounting means having first and second ends and a resilient intermediate portion, the first end of each mounting means being connected to the coil, the second end of each mounting means being connected to the reed,



and the intermediate portion of each mounting means providing a low resistance to relative movement between the coil and reed in a radial direction normal to the coil and a high resistance to relative movement between the coil and reed in directions normal to the radial direction.

4,697,456

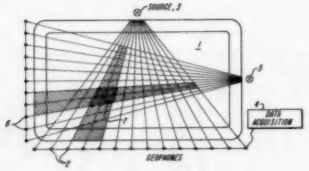
LEAKAGE TEST FOR LIQUID CONTAINMENT

Kenneth R. Maser, 14 Kensington Rd., Arlington, Mass. 02174

Filed Oct. 2, 1986, Ser. No. 914,348

Int. Cl.[4] G01M *3/24;* **G01N** *29/04*

U.S. Cl. 73—592 **16 Claims**



1. Apparatus for detecting leakage from an in-ground containment having a nominally impermeable floor, wherein the apparatus comprises

a burst source, placed in operation at one side of the containment

sensor means, including a first plurality of mechanical motion sensors in contact with the ground and in operation spaced in a row along a side of the containment away from the source, for each receiving and sensing energy transmitted from the source substantially along a first respective strip underlying the containment, and

recording means for simultaneously recording traces of the sensor means whereby there is developed a representation of a transmission anomaly beneath the containment indicative of leakage.

4,697,457

WASTE MATERIAL COMPRESSION TESTER

Edward G. Fochtman, Elmhurst, and Carl P. Swanstrom, Crestwood, both of Ill., assignors to Chemical Waste Management, Inc., Oak Brook, Ill.

Filed Mar. 3, 1986, Ser. No. 835,678

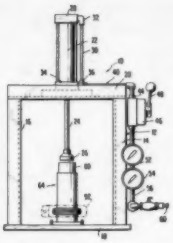
Int. Cl.[4] G01N *3/08*

U.S. Cl. 73—820 **9 Claims**

1. A waste material, compression tester comprising:

a reservoir for holding a sample of waste material containing liquid;

said reservoir has a waste material sample chamber, a waste liquid capturing container, and means between said chamber and container to detect the passage of exuded liquid;



pressure means to apply pressure to the waste material; and a support for the reservoir.

4,697,458

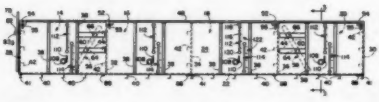
CRANE LOAD-TEST GAUGE

Herbert H. Billstein, 5978 SW. Shallowbrook La., Beaverton, Oreg. 97007

Filed Nov. 21, 1986, Ser. No. 933,750

Int. Cl.[4] G01L *3/00;* **G01M** *19/00*

U.S. Cl. 73—862 **20 Claims**



1. A crane load-test gauge for proof testing the lifting capacity of a crane comprising:

an elongate vessel having multiple fluid containing compartments therein, said compartments each having an open top side;

a fluid carrying manifold disposed along the length of said vessel having valve means associated with each of said compartments for introducing fluid into said compartments;

level adjusting means for adjusting the level of fluid in a compartment;

fluid level indicator means operable to indicate a fluid level in said vessel;

weight indicator means operable with said fluid level means to indicate the weight of the vessel; and

drain means for emptying completely the fluid contained in said vessel.

4,697,459

TORQUE MEASURING APPARATUS

Yutaka Nonomura; Jun Sugiyama; Hirofumi Komatsubara, and Masaharu Takeuchi, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Sep. 3, 1986, Ser. No. 903,139

Claims priority, application Japan, Sep. 4, 1985, 60-196817; Sep. 4, 1985, 60-196818

Int. Cl.[4] G01L *3/10, 25/00*

U.S. Cl. 73—862.36 **16 Claims**

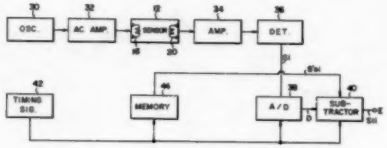
1. A torque measuring apparatus comprising:

a magnetic sensor for measuring in a noncontacting state the magnetostrictive amount of a rotary magnetic member for transmitting said torque;

a timing signal generator for dividing the rotational angle of said rotary magnetic member into a given number of segments and outputting a predetermined timing signal

every time said rotational angle of said rotary magnetic member passes each of said segments;

an offset signal generator for presetting an offset signal for each segment which is output from said magnetic sensor depending upon a rotational angle of said rotary magnetic member and subsequently outputting an offset signal



which corresponds to a respective segment on the basis of said timing signal; and

an arithmetic unit for subtracting said offset signal from a detection signal of said magnetic sensor at each segment;

whereby the transmitted torque of said rotary magnetic member is measured on the basis of the output of said arithmetic unit without being influenced by an offset component.

4,697,460

DEVICE FOR MEASURING TORQUE OF A ROTARY MECHANISM

Jun Sugiyama; Hirofumi Komatsubara; Keiichi Shimaoka; Masaharu Takeuchi, and Takashi Takeuchi, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

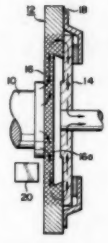
Filed Aug. 23, 1985, Ser. No. 768,949

Claims priority, application Japan, Aug. 30, 1984, 59-181676

The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.

Int. Cl.[4] G01L *3/10;* G01B *7/24*

U.S. Cl. 73—862.36 **26 Claims**



1. A device for measuring torque of a rotating disk comprising:

a magnetic rotating disk having a thinner region though which torque is transmitted, wherein increased strain is generated in said thinner region, and

a magnetic sensor having an excitation coil and a magnetic flux detection element wherein said magnetic sensor measures magnetostriction of the rotating disk and is disposed opposed to and with a predetermined clearance to one surface of said thinner region of the rotating disk,

wherein said magnetostriction is generated by anisotropy of the strain and this strain corresponds to the torque transmitted through the rotating disk whereby torque transmitted through the rotating disk is measured as magnetostriction of the rotating disk.

4,697,461

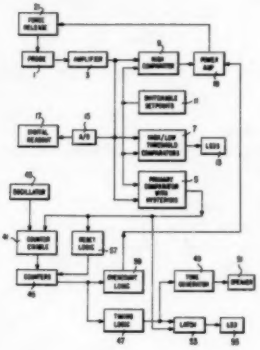
METHOD AND APPARATUS FOR VERIFYING THE SEISMIC INTEGRITY OF AN ELECTRONIC COMPONENT

Robert H. Jabs, Greensburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 19, 1986, Ser. No. 864,617

Int. Cl.[4] G01N *3/08, 19/04*

U.S. Cl. 73—862.53 **20 Claims**



1. Apparatus for verifying the seismic integrity of a lead of an electronic component which is connected in a circuit comprising, in combination:

first means for applying a force to a lead of an electronic component which is connected in a circuit and for producing a first output signal corresponding to the magnitude of the applied force; second means, responsive to said first output signal, for providing a second output signal when the magnitude of the applied force is at a desired preset value; and third means, responsive to said second output signal, for providing an indication when said second output signal is present for a preset desired period of time.

4,697,462

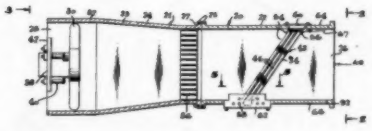
ACTIVE CLOUDWATER COLLECTOR

Bruce C. Daube, Jr.; Richard C. Flagan, and Michael R. Hoffmann, all of Pasadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed May 27, 1986, Ser. No. 867,820

Int. Cl.[4] G01N *1/24, 1/14, 1/18*

U.S. Cl. 73—863.21 **25 Claims**



1. A cloudwater collector comprising

a conduit open at opposite ends, including an air inlet at a front end thereof to permit entry of a cloudwater containing air sample into said conduit, and an air outlet at the opposite back end thereof,

a plurality of spaced Teflon strands in said conduit adjacent the front end thereof, said strands being mounted across said conduit at an acute angle facing said inlet,

the diameter of said strands being such that water droplets from a cloudwater sample, of a size range of 1–100 microns are collected on the strands upon impact therewith,

said acute angle being such that the impacted droplets flow down said strands and drain into the bottom of said conduit,

a fan at the back end of said conduit adjacent said air outlet for drawing a sample of air containing cloudwater through said inlet into said conduit,

means for reducing turbulence and producing essentially uniform flow of said air sample across said conduit, and

means for collecting a sample of the water droplets from the bottom of said conduit.

4,697,463

METHOD OF AND MEANS FOR TESTING FLOW PROPERTIES OF MAGNETIC TONERS

Anthony N. Spooner, Vale Park, and Luis Lima-Marques, Bedford Park, both of Australia, assignors to Research Laboratories of Australia Pty. Ltd., Australia

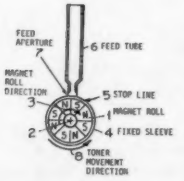
PCT No. PCT/AU84/00248, § 371 Date Aug. 6, 1985, § 102(e) Date Aug. 6, 1985, PCT Pub. No. WO85/02678, PCT Pub. Date Jun. 20, 1985

PCT Filed Mar. 12, 1984, Ser. No. 770,868

Claims priority, application Australia, Dec. 9, 1983, PG2781

Int. Cl.[4] G01N *11/02, 27/74*

U.S. Cl. 73—866 **5 Claims**



1. Apparatus for testing flow properties of magnetic toners consisting essentially of: a cylindrical non-magmetic stationary sleeve, a rotatably mounted multi-pole magnet roll contained within said stationary sleeve, means to rotate said magnet roll at predetermined speeds, means adapted to feed a predetermined speeds, means adapted to feed a predetermined quantity of magnetic toner onto the surface of said stationary sleeve while the magnet roll is rotated through a predetermined number of turns, markings contained on the surface of said stationary sleeve by which to observe dimensions of the circumferential and axial spread thereon of said predetermined quantity of magnetic toner fed thereto during said predetemined number of turns, where such spread is caused by the rotation of said multi-pole magnet roll during feeding of the toner and wherein the direction of such circumferential spread is opposite to the direction of rotation of said magnet roll, means to count the number of revolutions of said multi-pole magnet roll in relation to the spread of said predetermined quantity of magnetic toner as defined by said markings, whereby to determine the flow properties of the said toner.

4,697,464

PRESSURE WASHER SYSTEMS ANALYZER

Thomas E. Martin, 2208 36th St., Evans, Colo. 80620

Continuation-in-part of Ser. No. 852,637, Apr. 16, 1986. This application Oct. 20, 1986, Ser. No. 921,693

Int. Cl.[4] G01M *19/00*

U.S. Cl. 73—866.3 **13 Claims**

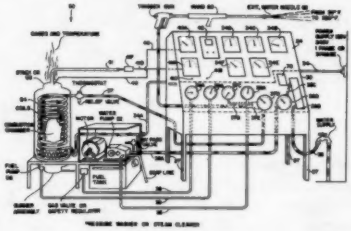
1. A self-contained, portable test panel which is adapted to be operably connected to a conventional pressure washer of the type including an electrical system including an electric motor, an exit nozzle for heated water, a water pump which is powered by said electric motor, and heater means for heating water; wherein said test panel comprises a housing which includes:

(a) voltage monitor means adapted to measure electrical line voltage in the electrical system of said pressure washer;

(b) electrical current measurement means adapted to measure current draw by said electric system;

(c) temperature sensing means adapted to monitor the temperature of water exiting said nozzle;

(d) pressure sensing means adapted to monitor the pressure of water exiting said nozzle;



(e) flow meter means adapted to measure the flow rate of water through said pressure washer; and

(f) short circuit test means adapted to detect the presence of electrical short circuits in said pressure washer;

wherein said portable test panel is adapted to simultaneously measure the operating parameters of said pressure washer which are measured or monitored by all of the foregoing means.

4,697,465

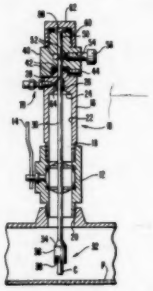
TEST COUPON HOLDER

Willie V. Evans, 104 W. Lantrip, and Gary K. Evans, 707 Danville Rd., both of Kilgore, Tex. 75662

Filed Apr. 25, 1986, Ser. No. 855,707

Int. Cl.[4] G01N *3/00, 17/00*

U.S. Cl. 73—866.5 **4 Claims**



1. A test coupon holder for inserting and removing a coupon from the interior of a pipeline comprising:

an elongated housing defining a chamber, said housing having connecting means at one end for connecting said housing to a pipe entry valve which is connected as a branch to a pipeline to be tested;

a guide body mounted on the other end of said housing having a bore in communication with said chamber;

a rod guidingly and sealingly received in said bore, said rod has a portion which extends through said housing and said portion has an end exterior of said housing for inserting a coupon;

a safety stop element fixedly secured to said exterior end said element being provided with means to releasibly hold the coupon and including a hollow metallic casing having

means at one end of said casing for connecting said element to said rod, said casing having an insulating material contained therein with said material being formed internally to provide said means to releasably hold the coupon;

collet means positioned and arranged within said bore of said guide body to clamp said rod;

locking means carried by said guide body and accessible from the exterior of said body to be operable to engage said collet means to fixedly clamp said rod in said bore; and

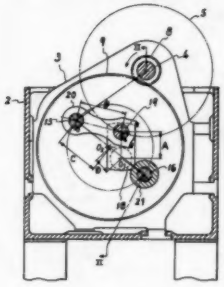
bleeder valve means carried by said housing communicating with said chamber to relieve pressure within said chamber.

4,697,466

DRIVE DEVICE FOR PRESS

Masayoshi Sugawara; Yuichi Nakamura, and Akira Matsui, all of Sagamihara, Japan, assignors to Aida Engineering, Ltd., Sagamihara, Japan

Filed Apr. 24, 1985, Ser. No. 726,887
Int. Cl.[4] F16H *21/16*
U.S. Cl. 74—27 **8 Claims**



1. A drive device for a press comprising:

a press frame;

a drive shaft;

a flywheel mounted on said drive shaft;

a clutch mounted on said drive shaft for engaging and disengaging said drive shaft with a power source;

a brake mounted on said drive shaft for stopping said drive shaft upon application thereof;

at least one main crankshaft rotatably mounted on the press frame; and

a unit drive device assembly comprising,

a unit casing adapted to be freely attachable and detachable to the press frame at a center of a crown portion of the press, said drive shaft being rotatably mounted on said unit casing,

an output shaft rotatably mounted in said unit casing, said output shaft having opposite outer end portions projecting outwardly from opposite sides of said unit casing,

coupling means for coupling and uncoupling at least one of said outer ends of said output shaft to said at least one main crankshaft, and

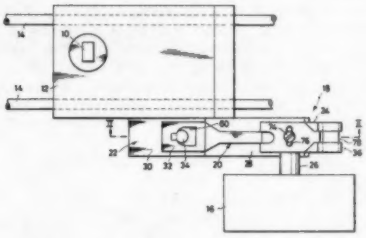
a quick-return mechanism within said unit casing operatively interposed between and engaged with said drive shaft and said output shaft for transmitting power from said drive shaft to said output shaft.

4,697,467

ROTARY TO LINEAR CONVERTER FOR USE IN A FLEXIBLE MAGNETIC DISK DRIVE OR THE LIKE

Yasuhiko Ando, Tachikawa, Japan, assignor to Teac Corportion, Tokyo, Japan

Filed Mar. 13, 1986, Ser. No. 839,440
Claims priority, application Japan, Mar. 18, 1985, 60-39602[U]
Int. Cl.[4] F16H *21/44*; G11B *5/56*
U.S. Cl. 74—89.2 **9 Claims**



1. A rotary to linear converter for translating the bidirectional rotation of a drive motor into the linear reciprocation of a guided member such as a head carriage in a data transfer apparatus, the drive motor having an output shaft extending at right angles with a predetermined linear path of the guided member, the rotary to linear converter comprising:

(a) a pulley nonrotatably mounted on the output shaft of the drive motor;

(b) a band of flexible, nonstretchable material looped about the pulley and affixed thereto with opposite end portions of the band extending away from the pulley;

(c) there being first and second apertures defined respectively in the opposite first and second ends of the band;

(d) a first hook on the guided member loosely in the first aperture in the band to anchor the first end thereof to the guided member, the first hook having an overhanging head to prevent the accidental detachment of the band, the first hook and the first aperture being so adapted in relation to each other that a first end portion of the band, associated with the first end thereof, is angularly displaceable in its own plane about the first hook;

(e) a second hook on the guided member loosely engaged in the second aperture in the band to anchor the seccond end thereof to the guided member, the second hook also having an overhanging head to prevent the accidental detachment of the band, the second hook and the second aperture being so adapted in relation to each other that a second end portion of the band, associated with the second end thereof, is angularly displaceable in its own plane about the second hook; and

(f) resilient means for imparting tension to the band in its longitudinal direction.

4,697,468

ROTARY MECHANISM

Gunnar Bergstrand, Huddinge, Sweden, assignor to Moveco System AB, Huddinge, Sweden

PCT No. PCT/SE85/00137, § 371 Date Nov. 15, 1985, § 102(e) Date Nov. 15, 1985, PCT Pub. No. WO85/04459, PCT Pub. Date Oct. 10, 1985
PCT Filed Mar. 28, 1985, Ser. No. 822,414
Claims priority, application Sweden, Mar. 28, 1984, 8401727
Int. Cl.[4] F16H *21/44*
U.S. Cl. 74—105 **7 Claims**

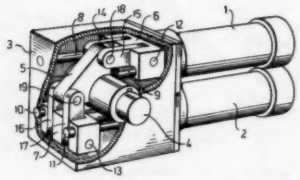
1. A rotary mechanism for converting a reciprocal linear motion of an actuating device into an oscillating rotation of an output shaft between two angular end positions, comprising:

a casing;

first and second cooperating, complementarily operating actuating units mounted on said casing, said first and second actuating units including first and second movable piston rods respectively which extend into said casing and means for reciprocating said piston rods linearly within said casing;

a plurality of elongate piston guide rods each attached at each end thereof to said casing, said plurality of guide rods including first and second guide rods located adjacent to said first piston rod and third and fourth elongate piston guide rods located adjacent to said second piston rod.

attaching means attaching an end of said piston rods to said guide rods, said attaching means including first and second yokes each having a central portion and end portions, said first yoke end portions being slidingly mounted on said first and second guide rods respectively and said second yoke end portions being slidingly mounted on said third and fourth guide rods respectively, said end of each said piston rod being fixedly connected to a respective one of said yoke central portions;



a plurality of links pivotally connected to said yoke central portions and including a first pair of links connected to said first yoke and a second pair of links connected to said second yoke, said piston guide rods constraining said yokes to rectlinear reciprocal movement axially of said piston guide rods;

a triangular lever having a first apex pivotally attached to said first pair of links, a second apex pivotally attached to said second pair of links, said triangular lever being attached to the output shaft, said guide rods being transverse to the output shaft;

said actuating units being controlled so that said pistons operate non-uniformly in linear speed and said links and lever being arranged and sized so that such non-uniform linear speed is delivered to the output shaft in a manner which causes torque to be delivered in a manner which increases adjacent to each of the two angular end positions of the output shaft oscillating rotation motion.

4,697,469

STEPLESS SPEED CHANGE DEVICE

Kikuzo Takamiya, Kitamoto; Hideyuki Ishibashi, and Kunitoshi Kozakae, both of Ageo, all of Japan, assignors to Bridgestone Cycle Co., Ltd., Japan

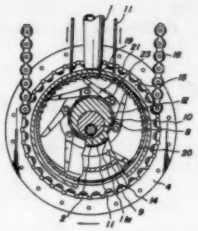
Filed Mar. 26, 1986, Ser. No. 844,108

Claims priority, application Japan, Apr. 1, 1985, 60-66613

Int. Cl.[4] F16H *23/04*

U.S. Cl. 74—117 **2 Claims**

1. In a stepless speed change device including an internally toothed ratchet formed in an inner circumference of a driving rotary body, and a plurality of pawls whose distal end engage said teeth of said internally toothed ratchet and bottoms of said pawls being pivotally connected to a driven rotary body rotatably provided on an eccentric cam assembly whose eccentricity is adjustable, thereby deriving output at the driven rotary body, said eccentric cam assembly consisting of an inner eccentric cam substantially in the form of a cylinder and an outer eccentric cam substantially in the form of a cylinder snugly rotatably fitted on said inner eccentric cam, said inner and outer eccentric cams being rotated relative to each other to change the eccentricity of the cam assembly, the improvement comprising a floating ring having an inner diameter smaller than a root diameter of teeth of said internally toothed ratchet



and arranged in floating condition in side-by-side relation to said internally toothed ratchet and permitting said distal ends of said pawls to inscribe said floating ring.

4,697,470

POWER TRANSFER DEVICE FOR FOUR-WHEEL DRIVE

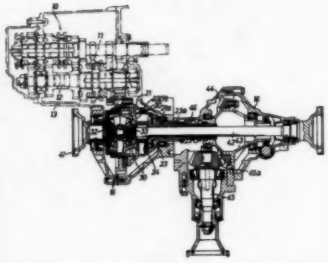
Kan Sasaki; Keisuke Takimura, and Nobuaki Katayama, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Feb. 26, 1986, Ser. No. 833,031

Claims priority, application Japan, Feb. 26, 1985, 60-026643[U]

Int. Cl.[4] F16H *37/08, 1/44*

U.S. Cl. 74—701 **5 Claims**



1. A power transfer device for four-wheel drive in combination with a power transmission having a transmission casing, an input shaft rotatably mounted within said transmission casing, an output shaft rotatably mounted within said transmission casing in parallel with said input shaft, a change-speed gearing mounted on said input and output shafts, and an output gear mounted on said output shaft for rotation therewith, the power trasnfer device comprising:

a transfer casing detachably secured at one side thereof to said transmission casing;

a first differential gear unit arranged within said transmission casing and including an input element in the form of a first gear casing rotatably mounted within said transmission casing and drivingly connected to said output gear, and a air of first output elements rotatably mounted within said first gear casing respectively for front-wheel drive and rear-wheel drive;

a second differential gear unit arranged coaxially with said first differential gear unit and including a second input member in the form of a second gear casing integral with one of said first output elements and rotatably mounted within said first gear casing, and a pair of second output elements rotatably mounted within said second gear casing;

a carrier member rotatably mounted within said transfer casing and arranged coaxially with said first and second differential gear units;

a first wheel axle drivingly connected at an inner end thereof with one of asid second output elements and extending outwardly from said transmission casing;

a second wheel axle drivingly connected at an inner end thereof with the other second output element of said second differential gear unit and extending outwardly from said transfer casing through said carrier member;

a hollow shaft arranged in surrounding relationship with said second wheel axle and having one end integral with the other first output element of said first differential gear unit and another end connected with said carrier member for rotation therewith; and

a clutch sleeve arranged between said first differential gear unit and said carrier member and axially slidably mounted on said hollow shaft for rotation therewith and being shiftable between a first position where it is disengaged from said first gear casing and a second position where it is engaged at one end thereof with said first gear casing;

an output gearing assembled within said transfer casing and arranged to be driven by said carrier member; and

means for axially slidably coupling an end of said clutch sleeve with one end of said carrier member in such a manner that said clutch sleeve is positioned relative to said carrier member in a predetermined radial and circumferential direction.

4,697,471

AUTOMATIC TRANSMISSION APPARATUS

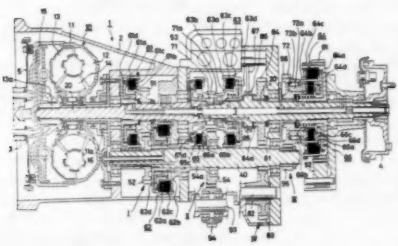
Manabu Hiketa, Hiroshima, Japan, assignor to Mazda Motor Corporation, Japan

Filed Jan. 22, 1986, Ser. No. 821,288

Claims priority, application Japan, Jan. 30, 1985, 60-16162; Jan. 30, 1985, 60-16163; Jan. 30, 1985, 60-16164; Oct. 29, 1985, 60-242420

Int. Cl.[4] F16H *3/08*

U.S. Cl. 74—359 **15 Claims**



15. An automatic transmission apparatus comprising:

an input shaft,

an output shaft disposed behind and coaxially with said input shaft,

a counter shaft disposed substantially parallel to both of said input and output shafts,

a first gear train including a first gear provided on said input shaft and a second gear provided on said counter shaft to be meshed with sid first gear so as to form a first power transmitting path,

first friction clutch means operative selectively to make and break the first power transmitting path,

a second gear train including a third gear provided through one-way clutch means on a rear end portion of said input shaft and a fourth gear provided on said counter shaft to be meshed with said third gear so as to form a second power transmitting path,

second friction clutch means provided at a front end portion of said output shaft and operative selectively to make and break a third power transmitting path from said input shaft through said one-way clutch means to said output shaft,

a third gear train including a fifth gear provided on a rear end portion of said counter shaft and a sixth gear provided on said output shaft to be meshed with said fifth gear so as to form a fourth power transmitting path,

third friction clutch means operative selectively to make and break said fourth power transmitting path,

fourth friction clutch means operative selectively to make and break the second power transmitting path,

a fourth gear train including a seventh gear provided on said counter shaft and an eighth gear provided on said output shaft to be meshed with said seventh gear so as to form a fifth power transmitting path, and

fifth friction clutch means operative selectively to make and break the fifth power transmitting path, wherein said second and fourth powe: transmitting paths are made for a first speed range, said first and fourth power transmitting paths are made for a second speed range, said second and fifth power transmitting paths are made for a third speed range, said first and fifth power transmitting paths are made for a fourth speed range, said third power transmitting path is made for a fifth speed range, and said first and second power transmitting paths and a supplemental power transmitting path from said second gear train through said second friction clutch means to said output shaft are made for a sixth speed range.

4,697,472

MULTI-ARTICULATED ROBOT

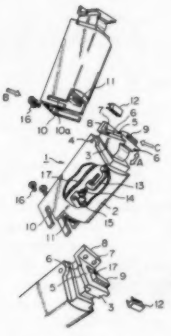
Masao Hiyane, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 26, 1983, Ser. No. 535,837

Claims priority, application Japan, Sep. 25, 1982, 57-165982; Sep. 27, 1982, 57-166722

Int. Cl.[4] B25J *17/00*; F16H *29/20*

U.S. Cl. 74—479 **11 Claims**



1. A multi-articulated robot for providing a plurality of articulations, comprising a plurality of articulation units, wherein:

each of said articulation units comprises a drive means and has a connecting portion disposed at least at one end of the articulation unit for connection with one of said connecting portions of at least one other respective one of the articulation units;

the respective connecting portions each have a coupling surface at which the respective articulation units are combined together, and are constructed so that the direction of relative movement for connecting said articulation units together is constrained to be substantially parallel to said coupling surfaces of said articulations; and

connection means for interconnecting said articulation units is provided at said connecting portion, said connection

means being arranged in a manner such that said articulation units are interconnected by a force having a direction that is substantially parallel to said coupling surfaces.

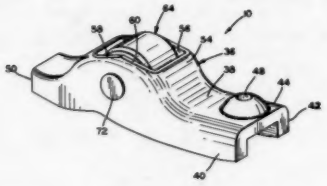
11. A multi-articulated robot for providing a plurality of articulations, comprising a plurality of articulation units, each said articulation unit having a connecting portion disposed at least at one end of the articulation unit for connection with the connecting portion of another of said articulation units and a magnetic force means for presecuring said connecting portions of the connected articulation units, each said connecting portion of said two connected articulation units having a connecting surface which contacts the connecting surface of the other, said connected articulation units being fastened together by fasteners inserted along an axis in a direction substantially parallel to said connecting surfaces, and means for weakening the magnetic force of said magnetic force means for disassembling said articulation units when said fasteners are not fastening said articulation units.

4,697,473

ROCKER ARM WITH CAM-CONTACTING ROLLER

Ramanlal L. Patel, Maumee, Ohio, assignor to The Henley Group, Inc., La Jolla, Calif.

Filed Aug. 7, 1986, Ser. No. 894,066
Int. Cl.[4] B23P *15/00*; F01L *1/18*; G05G *1/04*
U.S. Cl. 74—519 **9 Claims**



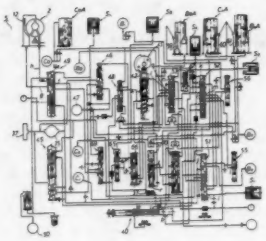
1. In combination, a lifter post, a valve stem spaced from said lifter post, an overhead cam above and between said valve stem and said lifter post, and a one-piece, cold-formed rocker arm of the cam-follower type comprising a one-piece metal body having a rounded recess in a first end portion thereof receiving an end of said lifter post on which said rocker arm can pivot, said end portion having an opening extending therethrough communicating with said rounded recess and said opening forming an oil reservoir, said body having an additional recess of rectangular transverse cross-sectional shape at a second end portion thereof receiving an end of said valve stem, said body having an intermediate generally convex portion facing away from said recesses, said convex portion having a rectangular opening extending completely therethrough at a central portion thereof, side walls of said body at said convex portion having axially-aligned round openings therein, an axle extending through said round openings and affixed to said body for prevention of longitudinal movement of said axle, a multiplicity of needle bearings around said axle between ends thereof, and a roller rotatably mounted on said needle bearings and having a circumferential portion projecting outwardly from said rectangular opening and engaging said overhead cam, upper edges of said side walls of said body at said rectangular opening extending upwardly to meet at apexes near a middle portion of the longitudinal edges of said rectangular opening.

4,697,474

LOCK-UP CLUTCH CONTROL DEVICE FOR A MULTI-SPEED AUTOMATIC TRANSMISSION

Koji Sumiya, Nishio; Yoshikazu Sakaguchi, Anjo; Takuji Taniguchi, Okazaki; Yutaka Taga, Aichi, and Yoshio Shindo, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Aisin-Warner Kabushiki Kaisha, both of Aichi, Japan

Filed Mar. 31, 1986, Ser. No. 846,042
Claims priority, application Japan, Jul. 31, 1985, 60-169195
Int. Cl.[4] F16H *47/00, 57/10*
U.S. Cl. 74—733 **5 Claims**



1. A lock-up clutch control device for a multi-speed automatic transmission, the automatic transmission having an input shaft, a speed changing gear mechanism including a sub-transmission unit and a main transmission unit operatively connected to the sub-transmission unit for outputting multiple transmission speeds, the sub-transmission unit outputting at least a low speed when in a lower speed mode and a high speed that is greater than the low speed when in a higher speed mode, the main transmission unit shiftable between at least first and second gears to assume at least first and second speed modes for outputting the multiple speeds with the sub-transmission unit, frictional engagement elements respectively and operatively associated with the main transmission unit and the sub-transmission unit for controlling the sub-transmission unit and the main transmission unit to selectively change various power transmission paths in the main transmission unit and the sub-transmission unit by selectively switching the sub-transmission unit between the lower speed mode and the higher speed mode and by switching the main transmission unit between at least the first and second gears to vary the transmission speed output by the speed changing gear mechanism, and a torque convertor having a lock-up clutch operatively connected between the input shaft and the speed gear changing mechanism for converting torque from the input shaft to drive the speed changing gear mechanism, the torque being converted directly from the input shaft to drive the speed changing gear mechanism via actuation of the lock-up clutch, said lock-up control device comprising:

a lock-up operation means operatively connected to the frictional engagement elements of the main transmission unit and to the frictional engagement elements of the sub-transmission unit for producing a control signal dependent upon the operation of the frictional engagement elements controlling said sub-transmission unit and said main transmission unit, said lock-up operation means producing said control signal when the sub-transmission unit is in the higher speed mode or while the main transmission unit is in second gear or higher;

a signal transmission means operatively connected to said lock-up control device for transmitting said control signal from said lock-up operation means; and

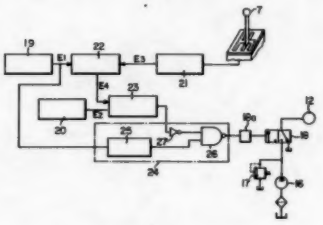
a lock-up relay valve operatively connected to said signal transmission means and the lock-up clutch, said lock-up relay valve controlling said lock-up clutch only when receiving said signal from said said signal transmission means.

4,697,475

CONTROLLER FOR VEHICLE TRANSMISSION WITH AUXILIARY TRANSMISSION

Sadanori Nishimura, and Noboru Sekine, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1984, Ser. No. 655,043
Claims priority, application Japan, Sep. 26, 1983, 58-176507
Int. Cl.[4] B60K *41/06*
U.S. Cl. 74—866 7 Claims



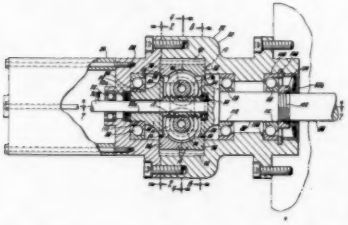
1. In a vehicular transmission having an auxiliary transmission with high-speed and low-speed transmission connected in series to a main transmission and an engine, wherein the auxiliary transmission has a hydraulic clutch disposed in the high-speed transmission line and a one-way clutch disposed in the low-speed transmission line, the low-speed transmission line being engaged through said one-way clutch when the hydraulic clutch is released, and the high-speed transmission line being engaged when said hydraulic clutch is applied and wherein said one-way clutch is overrunning, a controller improvement comprising, a high-speed transmission control means for applying and maintaining said hydraulic clutch in its applied state when the throttle opening of said engine is below a predetermined level.

4,697,476

PLANETARY WORM GEAR APPARATUS, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Richard L. Maxwell, 30780 Sibley, Romulus, Mich. 48174

Filed Aug. 6, 1984, Ser. No. 637,761
Int. Cl.[4] F16H *3/70, 57/10*
U.S. Cl. 74—785 6 Claims



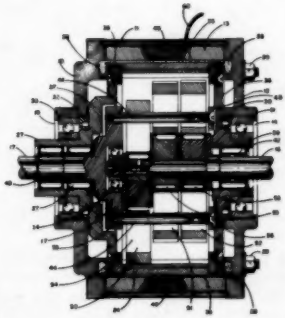
1. A gear assembly comprising, in combination:
a gear assembly housing;
an input shaft for said housing;
a gear assembly in said housing;
said gear assembly including an input worm fixedly attached to said input shaft;
a planetary carrier having a barrel shaped planetary worm-/gear enveloping said input worm; and
a double enveloping internal worm gear enveloping said planetary worm/gear;
wherein said barrel shaped planetary worm/gear includes a first end;
an opposing second end;
a concave mid-section intermediate said first end and said second end;
a first surface intermediate said first end and said mid-section;
a second surface intermediate said second end and said concave mid-section;
said first and said second surface each having worm threads thereon for engaging said split ring, internal, double enveloping worm gear; and
said concave mid-section having gear teeth thereon about the circumference of said planetary worm/gear at its mid section for engaging said input worm.

4,697,477

CONTINUOUSLY VARIABLE TRANSMISSION

Harold B. Barr, 4957 East Twain Ave., Las Vegas, Nev. 89121

Filed Sep. 19, 1984, Ser. No. 630,874
Int. Cl.[4] F16H *57/10, 1/28*
U.S. Cl. 74—793 1 Claim



1. A continuously variable transmission means for creating an adjustable speed constant torque output from a constant speed input, said transmission means comprising
an epicyclic gear casing, consisting of an input shaft having a plurality of eccentric cam lobes thereon with said cam lobes being disposed of at an equal angular spacing from each other, a plurality of epicyclic toothed gears arranged concentric with and freely rotating on each of said cam lobes and containing a plurality of drive pin orbit race openings, an interior casing surface having a greater number of teeth than said epicyclic toothed gears and with said epicyclic toothed gears having a plurality of teeth in mesh with said interior casing surface and able to epicycle on said interior casing surface in response to rotation of said cam lobes, an output shaft to which a plurality of drive pins are attached parallel to the axis of said output shaft with said drive pins following an orbital path in said drive pin orbit race openings when said epicyclic toothed gears epicycle on said interior casing surface, and
a magnetic particle chamber, consisting of an electrical coil casing surrounding said epicyclic gear casing with electrical leads attached to said electrical coil casing, two opposing end bearing caps attached to said electrical coil casing forming an enclosed cavity portion between the peripheral surface of said epicyclic gear casing and the interior surface of said electrical coil casing, and with said output shaft and input shaft of said epicyclic gear casing extending through said end bearing caps such that said epicyclic gear casing may freely rotate within said cavity, and including magnetic particles in said enclosed cavity portion,

said magnetic particle chamber providing a continuously variable braking action on said epicyclic gear casing in response to a variable electrical current applied to said electrical leads.

4,697,478

AUTOMATIC CRUISE CONTROL SYSTEM FOR A MOTOR VEHICLE

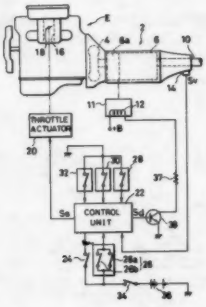
Makoto Mastumoto, Kure, and Mamoru Hayama, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 11, 1986, Ser. No. 906,500

Claims priority, application Japan, Sep. 11, 1985, 60-200761; Oct. 23, 1985, 60-235114; Oct. 25, 1985, 60-238627; Oct. 25, 1985, 60-238629

Int. Cl.[4] B60K *41/18, 41/06*

U.S. Cl. 74—859 **13 Claims**



1. A vehicle automatic cruise speed control system including gear stage shifting means for effecting shifting operations of gear stages of a vehicle automatic transmission, engine output control means for controlling the output of a vehicle engine, vehicle speed detecting means for detecting vehicle speed and producing a vehicle speed signal, first control means responsive to said vehicle speed signal and controlling said first control means in accordance with the vehicle speed signal for maintaining the vehicle speed at a desired value, speed descriminating means for producing a deviation signal when the vehicle speed signal is deviated from a reference signal representing the desired speed by a predetermined value, second control means responsive to said deviation signal for actuating said gear stage shifting means to shift down said gear stages of the automatic transmission when the deviation signal is continuously received for a first predetermined time period and to shift up said gear stages of the automatic transmission when the deviation signal is not continuously received for a second time period from a time when the deviation signal has disappeared.

4,697,479

ENGINE THROTTLE OPENING DEPENDENT HYDRAULIC VEHICULAR TRANSMISSION SYSTEM

Yoichi Hayakawa, Toyoake; Masao Kawai, Chiryu; Kenichi Yoshizawa, Toyota; Yoshiharu Harada, Toyota, and Kagenori Fukumura, Toyota, all of Japan, assignors to Aisin-Warner Limited, Anjo and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Jan. 15, 1986, Ser. No. 819,868

Claims priority, application Japan, Jan. 19, 1985, 60-7782; Jan. 19, 1985, 60-7773

Int. Cl.[4] B60K *41/16, 41/18*

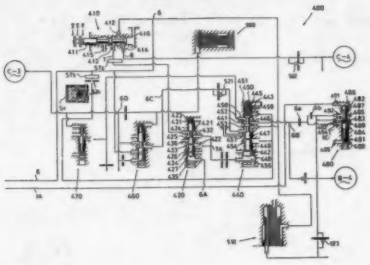
U.S. Cl. 74—867 **5 Claims**

1. A hydraulic controller for a vehicular transmission associated with a vehicle engine including means for varying a throttle opening thereof; said hydraulic controller comprising

two friction engaging devices;

a shift changing means for engaging one friction engaging device and disengaging the other friction engaging device for changing a speed step;

an orifice control means connected between said shift changing means and said one friction engaging device; said orifice control means having a plurality of orifices;



an actuator connected between said one friction engaging device and said orifice control means; and

means for varying the quantity of working oil supplied to said hydraulic actuator through at least some of said plurality of orifices as a function of the degree of said throttle opening.

4,697,480

RADIATOR CAP SAFETY TWIST-OFF TOOL

Terry Robideau, 1426 S. Bentley Ave., Los Angeles, Calif. 90025

Filed Sep. 29, 1986, Ser. No. 912,598

Int. Cl.[4] B67B *7/44*

U.S. Cl. 81—3.09 **20 Claims**

1. A tool for facilitating safe twist-off of an automotive radiator cap comprising:

a wrench element having an elongated handle and a radiator cap receiving socket at one end of said handle; and

a shield element having a tubular grip and a hood affixed to one end of said tubular grip;

said elongated handle being rotatable within said tubular grip and also slidably movable between a first position wherein said socket remains exposed below said hood for facilitating engagement of the socket to a radiator cap and a second position wherein said socket is retracted within and radially shrouded by said hood for deflecting hot liquid ejected from a radiator upon removal of a radiator

cap which is thus safely diverted by the hood away from the tool user.

4,697,481

INTEGRALLY MOLDED HAMMER WITH SEPARATED HEAD AND HANDLE CORES

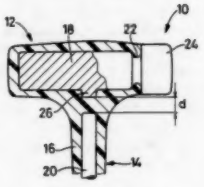
Sadao Maeda, Okazaki, Japan, assignor to Maeda Shell Service Co., Ltd., Aichi, Japan

Filed Feb. 14, 1986, Ser. No. 829,111

Claims priority, application Japan, Feb. 21, 1985, 60-33417; May 17, 1985, 60-74032[U]; May 17, 1985, 60-74033[U]

Int. Cl.[4] B25D *1/02*

U.S. Cl. 81—22 **9 Claims**



1. A hammer, comprising:

a head portion made of a resin material;

a handle portion made of a resin material cooperating to form a generally T-shaped integral body with said head portion;

a head core imbedded in said head portion in a longitudinal direction of said head portion, at least one end of said head core being exposed, so as to provide an impact surface at said at least one exposed end;

a handle core imbedded in said handle portion in a longitudinal direction of said handle portion, said head core and said handle core being separated from each other in said longitudinal direction of said handle portion by a predetermined distance by a portion of said resin material by which said head and handle portions are connected.

4,697,482

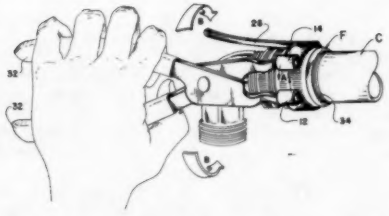
PLIERS GRIPPING BAND

Robert A. Hutton, 10890 Galvin St., Ventura, Calif. 93004

Filed Jun. 18, 1986, Ser. No. 875,497

Int. Cl.[4] B25B *13/52*

U.S. Cl. 81—64 **5 Claims**



1. A tool accessory for gripping an annular-shaped workpiece extending about an endless pipe or conduit consisting of a C-shaped flexible band having a center axis and opposing free ends which are spaced-apart and void of any structure in the gap between said ends, each end consisting of an opening having a longitudinal axis extending parallel with said center axis and radially equidistant from said center axis, said band having an elongated handle member attached to said band adjacent one of said ends and extending from said band in a direction about coextensive with said center axis.

4,697,483

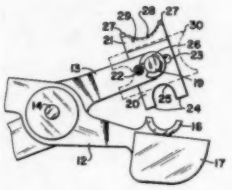
TOOL FOR ATTACHING AND DETACHING SPRING CLIP FROM SHAFT

Herman R. Rodgers, P.O. Box 43, Ellerslie, Ga. 31807

Filed Dec. 12, 1985, Ser. No. 808,179

Int. Cl.[4] B25B *7/02*

U.S. Cl. 81—418 **18 Claims**



1. A tool for assembling and disassembling a split-ring retainer clip having free ends from a shaft comprised a pair of pivotally connecting handles having a first jaw on one said handle and a second jaw on another said handle, said jaws being oppositely facing and cooperating with each other in several different movable positions of said second jaw on said other handle, said first jaw including a first seat means for receiving a shaft, and said second jaw having a head movably indexable on said other handle between two operating positions with said first jaw, said head in a first said position having prong means for engaging free ends of a split-ring retainer clip to disassemble same from a shaft, and said head in a second said position having a second seat means to nestingly and substantially fully receive a split retainer clip with its free ends facing outwardly for assembly of a split-retainer clip to a shaft, said handles being adapted to be selectively manipulated for moving said jaws together and away from each other, wherein said first seat means includes a spaced pair of semicircular elements extending substantially parallel to each other and providing a slot therebetween to permit the split-ring retainer clip to pass therethrough when being forcibly removed from the shaft.

4,697,484

ROTATING DRILLING HEAD

Gerhard Klee, Fuchshohl 102, D6000 Frankfurt/Main; Wilfried Gerk, Amselstr. 10, D6074 Roedermark, and Norbert Jeschke, Breslauerstr 3, D6057 Dietzenbach-Hexenberg, all of Fed. Rep. of Germany

Filed Sep. 13, 1985, Ser. No. 776,160

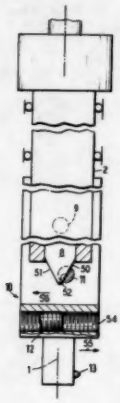
Claims priority, application Fed. Rep. of Germany, Sep. 14, 1984, 3433793

Int. Cl.[4] B23B *29/034*

U.S. Cl. 82—1.5 **18 Claims**

1. In a rotating head or the like having a drilling spindle being rotated on an axis of rotation, a tool carrier, means for mounting the tool carrier on an end of the spindle including means for finely adjusting the position of the tool carrier transversely to the axis of rotation, said means for finely adjusting including a wedge carrier having a bevel at one end and being guided for movement in the drilling spindle along the axis of rotation, means for shifting the wedge carrier along the axis, and a sliding surface being provided on the tool carrier and cooperating with the bevel of the wedge carrier to adjust the transverse position of the tool carrier relative to the drilling spindle, said tool carrier having pressing means to urge the sliding surface against the bevel of the wedge carrier, the improvements comprising said pressing means including the center of gravity of the tool carrier being offset from the axis

of rotation on a side opposite the position of the sliding surface so that centrifugal forces, which occur during rotation of the



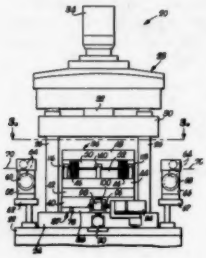
head, will press the sliding surface of the tool carrier onto the bevel of the wedge carrier.

4,697,485

DIE PRESS HAVING 3-AXIS REGISTRATION SYSTEM OPERABLE DURING MATERIAL ADVANCEMENT

Raney, Charles C., Kansas City, Kans., assignor to Preco Industries, Inc., Lenexa, Kans.

Filed Apr. 16, 1986, Ser. No. 852,829
Int. Cl.[4] B26D *5/34, 7/00*
U.S. Cl. 83—34 **15 Claims**



1. A method of successively aligning a die unit work structure of a die cutting press with defined areas of elongated we,b material during movement of said defined areas toward the work structure of the press, said method comprising the steps of:

moving said web material by advancement means toward said work structure of the die cutting press in a direction parallel to the longitudinal axis of said web material;

sensing an elongated indicator segment disposed longitudinally of said web material while said web material is moving toward said work structure;

providing a first signal in response to sensing of said indicator segment to a first power operated shifting means and to a second power operated shifting means;

shifting said die unit in response to said first signal by said first shifting means in a straight direction laterally of said web advancement direction while said web material is moving toward said work structure as may be necessary to successively bring said die unit work structure into predetermined positional relationship relative to each of said web defined areas in a direction laterally of said web advancement direction;

rotating said die unit in response to said first signal by said second shifting means about an axis perpendicular to a plane containing said web material while said web material is moving toward said work structure as may be necessary to successively bring said die unit work structure into a predetermined rotative orientation relative to each of said web defined areas;

sensing an indicia means associated with each of said defined areas and disposed on said web material while said web material continues to move toward said work structure;

providing a second signal in response to sensing of said indicia means to said web advancement means when said indicia means is located in predetermined positional relationship relative to said work structure in a direction longitudinally of the web material; and

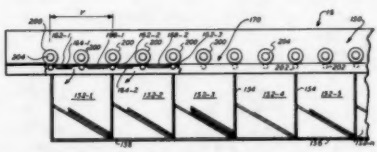
interrupting the movement of said web material in response to said second signal by said web advancement means whereby a respective defined area is in registration with said work structure as soon as said web movement is interrupted to permit immediate die cutting by said press die unit without further shifting or rotation of the latter.

4,697,486

BOOK COUNTER

Vincent Vulcano, 301 E. 48th St., Apt. 11G, New York, N.Y. 10017

Filed Jan. 22, 1985, Ser. No. 693,174
Int. Cl.[4] B26D *7/06*; B65H *29/49*
U.S. Cl. 83—79 **20 Claims**



1. A book counter; comprising:

(a) book supply means;

(b) feed means for feeding books one by one from said book supply means;

(c) cover stripper means disposed to receive books as they are fed from said book supply means and coacting with each book so received to strip a cover from the book;

(d) cover sorter means disposed to receive covers from said cover stripper means and to coact with the covers so received to move the covers along a predetermined cover sorting path with a predetermined spacing between each cover;

(e) sensing means disposed proximate said cover sorting path to sense for predetermined indicia when carried by the cover;

(f) said cover sorting means including a plurality of cover sorting bin means, disposed proximate said cover sorting path and so as to receive covers therefrom;

(g) said plurality of cover sorting bin means including a plurality of first bin means and a plurality of second bin means;

(h) said cover sorting means also including cover diverter means for selectively moving covers from said cover sorting path into selected ones of said cover sorting bin means;

(i) computer and electronic control means for operating the book counter for a predetermined time period;

(j) said predetermined time period including a plurality of even cycles which occur during first time intervals, and a plurality of odd cycles which occur during second time intervals; and

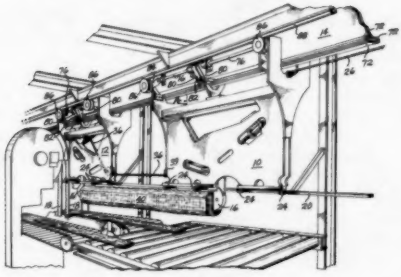
(k) said computer being interconnected with and controlling operation of said feed means and said cover stripper means so that when predetermined indicia are sensed first selected ones of said covers are diverted by said cover diverter means into selected ones of said plurality of first bin means during said even cycles which occur during said first time intervals and second selected ones of said covers are diverted by said cover diverter means into selected ones of said plurality of second bin means during said odd cycles which occur during said second time intervals.

4,697,487

ADJUSTABLE CABLE DRIVEN CARRIAGE SYSTEM AND METHOD

Robert E. Cameron, P.O. Box 251, Warrenton, Oreg. 97146

Filed Sep. 20, 1982, Ser. No. 419,998
Int. Cl.[4] B27B *29/08, 15/08*
U.S. Cl. 83—708 **37 Claims**



1. An end-dogging log carriage system for processing random-length logs, comprising:

an elongated track;

a pair of log carriage sections supportably guided on said track, each of said carriage sections including respective dogging means for supportably engaging one end of a log;

carriage drive means including an elongated flexible drive tension member extending between and interconnecting said respective carriage sections for selectively driving said carriage sections in unison along said track;

clamping means for selectively adjusting the length of said log carriage by moving one of said carriage sections along said track with respect to the other one of said carriage sections and clamping a log therebetween without detaching either of said carriage sections from said drive tension member, said clamping means including means for selectively changing the operative length of said drive tension member between said carriage sections in response to the movement of one of said carriage sections along said track with respect to the other one of said carriage sections;

wherein said clamping means includes an elongated flexible clamping tension member extending between and interconnecting said respective log carriage sections for moving one of said log carriage sections along said track with respect to the other one of said log carriage sections; and

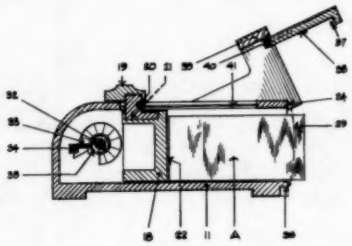
wherein said means for changing the length of said drive tension member comprises spooling means mounted on one of said carriage sections and connected to said drive tension member and said clamping tension member for simultaneously shortening the operative length of one of said tension members while lengthening the operative length of the other of said tension members.

4,697,488

DEVICE FOR SLICING AND STORING FOOD SUCH AS CHEESE AND THE LIKE

Gregory B. Cole, 103 Locust, Santa Cruz, Calif. 95060

Filed Mar. 4, 1985, Ser. No. 708,018
Int. Cl.[4] B26D *1/547*
U.S. Cl. 83—437 **5 Claims**



1. A device for slicing and storing a block of cheese and like food matter comprising

a. a carrier having

b. a bottom, two spaced side walls extended up therefrom, an end and a top, said carrier having an open aperture end,

c. means for advancing the food matter through the aperture end,

d. a cutting tool component consisting of a wire cutting tool mounted between two spaced legs projecting out from an integral cross bar movably mounted on and integral with the carrier such that the wire cutting tool passes across (of) the aperture end,

e. means resiliently urging said cutting tool component to an inoperative position,

f. a door mounted about an axial centerline whereby the aperature end is closed,

g. said door being mounted on the two spaced legs and crossbar of the cutting tool component,

h. resilient means urging said door to open position

i. Resilient means urging said door to engage a locking catch to restrain said door in a closed position,

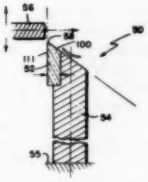
j. a (slideable) food pusher contained within said carrier.

4,697,489

ULTRAMICROTOME TOOL

George A. Kim, 4754 N. Jenny Rd., Indianapolis, Ind. 46208

Division of Ser. No. 628,024, Jul. 5, 1984, Pat. No. 4,581,969.
This application Sep. 9, 1985, Ser. No. 773,559
The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.
Int. Cl.[4] G01N *1/06*
U.S. Cl. 83—856 **25 Claims**



1. An ultramicrotome tool comprising a diamond blade having a longitudinal axis, the blade including a first substantially planar surface substantially coplanar with a first naturally occurring crystal plane within the crystalline structure of the diamond and a second substantially planar surface substantially

coplanar with a second naturally occurring crystal plane within the crystalline structure of the diamond, the first and second surfaces intersecting to define a cutting edge,

a shank for holding the diamond blade, the shank having a longitudinal axis, and

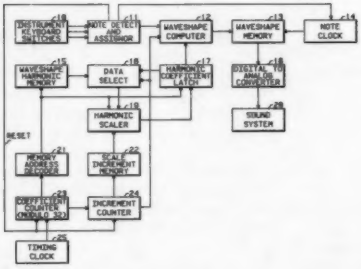
means for mounting the diamond blade on the shank to orient one of the first and second planar surfaces of the blade to be substantially parallel to the longitudinal axis of the shank.

4,697,490

MUSICAL TONE GENERATOR USING INCREMENTAL HARMONIC VARIATION

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co., Ltd., Hamamatsu, Japan

Filed May 29, 1986, Ser. No. 867,999
Int. Cl.[4] G10H *1/06, 7/00*
U.S. Cl. 84—1.01 **10 Claims**



1. In combination with a keyboard operated musical instrument having an array of keyswitches, apparatus for producing musical tones having time variant spectral components comprising;

an assignor means whereby a detect data word is generated in response to each actuated keyswitch in said array of keyswitches and one of a plurality of tone generators is assigned to each actuated keyswitch and whereby a corresponding detect data word is provided to the corresponding said assigned tone generator; and

said plurality of tone generators each of which comprises,

a first memory means for storing a preselected set of harmonic coefficients,

a second memory means for storing harmonic coefficients,

a memory address decoding means for simultaneously reading out harmonic coefficients stored in said first memory means and harmonic coefficients stored in said second memory means,

a third memory means for storing scaling constants,

a scaling addressing means for reading out scaling constants from said third memory means,

a data select means whereby said harmonic coefficients read out from said first memory means are selected in response to a select signal and whereby said harmonic coefficients read out from said second memory means are selected if said select signal is not present,

a scaling means whereby said harmonic coefficients selected by said data select means are scaled in magnitude in resposne to said scaling constants read out from said third memory means to form a set of scaled harmonic coefficients and whereby said scaled harmonic coefficients are stored in said second memory means,

a means for computing whereby a set of data points is computed in response to said scaled harmonic coefficients stored in said second memory means, and

a conversion means for producing a musical tone responsive to said data points computed by said means for computing.

4,697,491

ELECTRIC FEEDBACK GUITAR

Terrance R. Maloney, 607 W. Springfield, Champaign, Ill. 61820

Filed Jun. 17, 1986, Ser. No. 875,018
Int. Cl.[4] G10H *3/24, 3/18*
U.S. Cl. 84—1.05 **6 Claims**

1. An electric stringed instrument having a plurality of strings, a neck, a body, and a pickup for driving an amplifier comprising:

(a) a sound reproducing element attached to the top of the neck for transducing the tones of the strings into the neck;

(b) an electrical connector in the body for receiving the output of the amplifier;

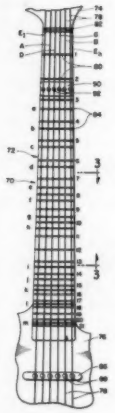
(c) wire means for conducting electric signal from the electrical connector in the body to the sound reproducing element at the top of the neck.

4,697,492

STRINGED MUSICAL INSTRUMENTS WITH MAGNETIC PICKUPS

Mark L. Freed, Santa Monica, Calif., assignor to Diversco, Inc., Los Angeles, Calif.

Filed Apr. 11, 1986, Ser. No. 850,257
Int. Cl.[4] G10H *3/18;* G10D *3/06*
U.S. Cl. 84—1.16 **7 Claims**



1. In a stringed musical instrument, in combination:

(a) an instrument body including an elongated fretted fingerboard, a headpiece extending upwardly from the fingerboard and a tailpiece extending downwardly from the fingerboard;

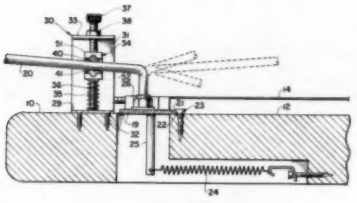
(b) a plurality of selectively adjustable string tensioning members mounted on said headpiece;
(c) a plurality of strings extending parallel to and above the front face of the fingerboard, each string being attached at its upper end to one of said tensioning members and being anchored at its lower end to said tailpiece;
(d) a set of primary frets placed in regular sequence along the fingerboard, transverse of said strings;
(e) a first magnetic pickup assembly carried by said tailpiece and including a plurality of magnetic pickup heads, each adjacent to and in operative relationship with one of said strings;
(f) a second magnetic pickup assembly carried by said fingerboard in proximity with said headpiece and including a plurality of magnetic pickup heads, each adjacent to and in operative relationship with one of said strings; and
(g) a set of secondary frets each placed intermediate a pair of primary frets along the fingerboard, transverse of said strings; each secondary fret being so placed between two primary frets that upon depression of a string of the instrument between any primary fret and an adjacent secondary fret, accompanied by a tapping, plucking or strumming of said string, two harmonically resolved, bi-directional musical notes will be generated through said string with one of said notes picked up by a pickup head of the first magnetic pickup assembly carried by the tailpiece and the other of said notes picked up by a pickup head of the second magnetic pickup assembly carried by the fingerboard in proximity with said headpiece.

4,697,493

TREMOLO CONTROL ARM RETAINER

James E. Ralston, 13627 Leadwell Street, #1, Van Nuys, Calif. 91405

Filed Sep. 19, 1986, Ser. No. 910,236
Int. Cl.[4] G10D *3/00*
U.S. Cl. 84—313 **5 Claims**



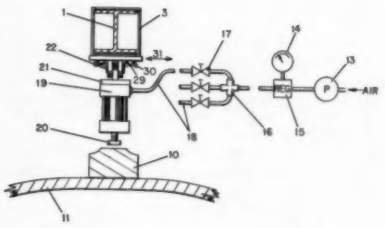
1. A retainer for stabilizing the strings of a guitar having a tremolo device with a tremolo arm, the combination comprising;
a tremolo arm;
a retaining means mounted on the guitar operable in cooperation with said tremolo arm to hold said tremolo arm in a fixed position whereby inadvertent de-tuning of the guitar strings in avoided;
said retaining means includes a bracket carried on the guitar adjacent to the tremolo device; and
a holder movably mounted on said bracket having an opening leading into a holding cavity for insertably receiving said tremolo arm;
guide means interconnecting said holder with said bracket permitting limited vertical movement of said holder with respect to said bracket; and
resilient means contracted between said holder and bracket normally biasing said holder in a selected vertical direction.

4,697,494

PIANO SOUNDBOARD DOWNBEARING FORCE SIMULATOR

Thomas A. Lowell, 2360 Galls Cr. Rd., Gold Hill, Oreg. 97525

Filed Aug. 19, 1986, Ser. No. 897,996
Int. Cl.[4] G10G *7/00*
U.S. Cl. 84—458 **17 Claims**



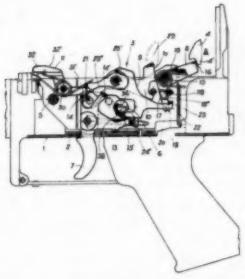
1. In a piano having a string plate with string plate bridges, string tensioning means, soundboard string bridges and a soundboard, the elevations of said string plate bridges relative to said soundboard string bridges being such that said soundboard deflects slightly upon the tensioning of said strings, a method for ease and precision of constructing said relative elevations of string plate bridges and soundboard string bridges, said method comprising the steps of:
a. applying a substantially predetermined amount of pressure to said sounboard string bridges to deflect said soundboard while simultaneously
b. adjusting the elevations of said string plate bridges and or said soundboard string bridges relative to each other whereby the amount and direction of force exerted by said strings when fully tensioned upon said soundboard string bridges and soundboard will substantially be of a predetermined amount.

4,697,495

TRIPPING MECHANISM FOR THE CONVERSION CLOSED-BOLT AUTOMATIC RIFLES TO OPEN-BOLT ONES

Pier G. Beretta, Brescia, Italy, assignor to Fabrica d'Armi P.Beretta S.p.A., Italy

Filed Dec. 6, 1985, Ser. No. 806,283
Claims priority, application Italy, Dec. 10, 1984, 5243 A/84
Int. Cl.[4] F41C *17/06, 5/06*
U.S. Cl. 89—143 **5 Claims**



1. Tripping mechanism for the conversion of closed-bolt type automatic rifles having a trip box, to open bolt-type automatic rifles having a bolt carriage displaceable from a rearward, armed position to a forward, firing position, said bolt

carriage being provided with a shoulder for the rearward arrest thereof, said mechanism comprising:

a box-like support removeably insertable, as a unit, in said trip box, said mechanism cooperating with said bolt carriage and with a safety rod which functions as a selector for the firing modes of the rifle, said modes being an individual shot firing mode and an automatic firing mode, said box-like support having mounted thereon (a) a trigger, rotating about a first pin and having a rear wall cooperating with said selector and further having an upwardly facing arm ending with a thrusting portion and a tooth; (b) a trip block pivoting on a second pin and having a first spring-urged arm for engagement with said shoulder of said bolt carriage and a second downwardly facing arm; (c) a connecting rod pivoting about said upwardly facing arm of said trigger, and having a rear arm with a rear shoulder at the extremity thereof for engagement with and disengagement from said second arm of said trip block, said connecting rod having a lower arm engageable by said selector, and an upper arm having a top inclined surface engageable by said bolt carriage; said selector extending transversely within said box-like support to be positioned between said tail of said trigger and said lower arm of said connecting rod.

4,697,496

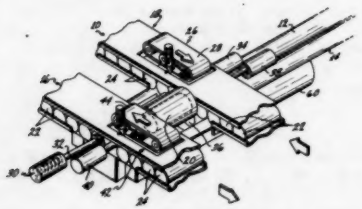
METHOD AND APPARATUS FOR HANDLING BELTLESS AMMUNITION IN A TWIN-BARRELED GUN

Morris Goldin, Orange, Calif., assignor to Hughes Helicopters, Inc., Culver City, Calif.

Filed Jun. 17, 1985, Ser. No. 745,135

Int. Cl.[4] F41D *10/28*

U.S. Cl. 89—33.03 **16 Claims**



1. An improvement in an automatic gun including a double-barrel each with a barrel bore having a longitudinal axis for alternately firing beltless cased ammunition from each barrel comprising:

an oscillating breech having two chambers defined therein, said oscillating breech having a longitudinal axis generally parallel to said longitudinal axes of said double barrels, said oscillating breech rotating in an oscillating cycle about said longitudinal axis of said breech to alternately position each one of said two chambers defined in said oscillating breech in alignment with a corresponding barrel bore defined in a respective one of said double barrels, said chambers defined in said oscillating breech being opened at each opposing end of each chamber to permit said beltless cased ammunition to be slidingly disposed therethrough;

means for rotating said oscillating breech in said oscillating cycle about said longitudinal axis of said oscillating breech, said means for rotating coupled to said oscillating breech;

a first ammunition chute generally disposed transversely with respect to said longitudinal axis of said oscillating breech;

a second ammunition chute transversely disposed with respect to said longitudinal axis of said oscillating breech and disposed opposite said first ammunition chute, said first and second ammunition chutes disposed on opposing sides of said oscillating breech and aligned generally in the same plane, said double barrels aligned below said plane of said first and second ammunition chutes, said oscillating breech alternately rotating each chamber of said oscillating breech in alignment with said first and second ammunition chutes and subsequently in alignment with a corresponding one of said barrel bores;

means for loading each said chamber when said corresponding chamber is rotated in an upward position in alignment with said first and second ammunition chutes, same means for loading including a cocked rammer arranged and configured to force said beltless cased ammunition from said first and second ammunition chutes into said oscillating breech, said beltless cased ammunition being loaded in each of said chambers from one of said first and second ammunition chutes thereby forcing said beltless cased ammunition previously loaded in said corresponding chamber therefrom into an opposing one of said first and second ammunition chutes; and

buffer means opposing each means for loading to buffer the shock of said beltless cased ammunition being forced through said corresponding chamber into said opposing ammunition chute by said means for loading, whereby said automatic gun is fired at a rapid rate using beltless cased ammunition in such a manner that delivery of unfired beltless cased ammunition to and spent beltless cased ammunition from said automatic gun is facilitated.

4,697,497

HYDRAULIC AMPLIFIER VALVE ASSEMBLY

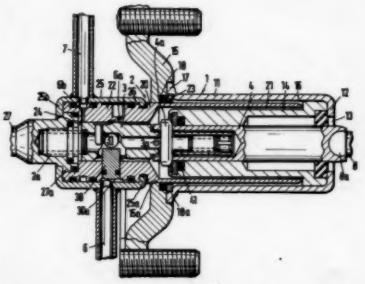
Günter Leineweber, and Rolf Warnecke, both of Gifhorn, Fed. Rep. of Germany, assignors to Volkswagen Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

Filed Dec. 6, 1985, Ser. No. 805,705

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1984, 3444614

Int. Cl.[4] F15B *9/10, 11/08;* **B60T** *13/00, 13/20*

U.S. Cl. 91—372 **9 Claims**



1. In a hydraulic amplifier valve assembly having an input end arranged for exposure to an external pressing force to be amplified and an output end arranged to deliver an amplified force, said assembly including a valve housing; an amplifier piston axially slidably disposed in the valve housing and having an end portion continuously projecting beyond the valve housing towards said output end; a control plunger axially slidably disposed in the amplifier piston; a reaction piston axially slidably disposed in said valve housing and having a first end force-transmittingly connected to said control plunger and an opposite, second end for directly receiving said external pressing force; ports provided in said amplifier piston and arranged for being controlled by said control plunger; a pressure conduit coupling nipple and a return conduit coupling nipple carried by said end portion of said amplifier piston and arranged for maintaining communication with said ports; the improvement comprising

(a) a sheet metal, rotationally symmetrical, elongated, cup-shaped housing shell having an axis and an end wall at said input end and an open end oriented towards said output end; said end wall having an aperture traversed by said reaction piston with a substantial clearance; said housing shell forming part of said valve housing;

(b) a sheet metal inner cylinder sleeve extending coaxially within said housing shell and having an axial length substantially equalling that of said housing shell; said inner cylinder sleeve being affixed to said housing shell at said end wall thereof and being radially spaced therefrom for defining therewith an annular space extending substantially along the axial length of said cylinder sleeve and being hermetically sealed towards said input end; said reaction piston being axially slidably received in said cylinder sleeve; said cylinder sleeve forming part of said valve housing;

(c) a securing flange surrounding said housing shell and being affixed thereto at said open end thereof;

(d) a cylinder tube forming an integral part of said amplifier piston and having an open end oriented towards said input end; said cylinder tube being axially slidably received in said annular space;

(e) a first seal sealingly surrounding said cylinder tube of said amplifier piston and being stationarily situated in a zone of said open end of said housing shell; and

(f) a second seal sealingly surrounding said reaction piston and being stationarily situated at least approximately at a same axial height as said first seal.

4,697,498

DIRECTION CONTROL VALVE FITTED WITH A FLOW CONTROL MECHANISM

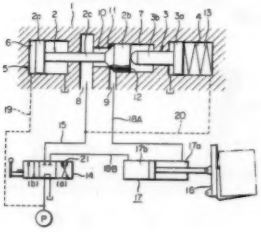
Seiji Yoshikawa; Isao Sato; Shigenori Nakayama, and Mitsuhiro Amazaki, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Aug. 26, 1986, Ser. No. 900,402

Claims priority, application Japan, Sep. 10, 1985, 60-201097

Int. Cl.[4] F15B *13/04*

U.S. Cl. 91—420 **3 Claims**



1. A direction control valve for controlling the flow of fluid under pressure between a fluid pressure source and an hydraulic cylinder having a reciprocally movable, fluid-actuated piston therein carrying rod means connected to an exterior device whereby movement of said piston drives said device, said hydraulic cylinder having first and second fluid chambers separated by said movable piston, said direction control valve comprising spool valve means connected to said pressure source and having a movable spool member operable to alternately reverse the direction of fluid flow within said direction control valve and to an from said hydraulic cylinder, a flow control mechanism comprising first pressure chamber means having a poppet seat, and a second pressure chamber, a poppet-type piston mounted within said first pressure chamber means for reciprocal movement into and away from closing engagement with said poppet seat, spring means urging said poppet-type piston towards its said closing position, a second piston mounted for reciprocal movement within said second pressure chamber, and rod means connecting said poppet-type piston and said second piston for concurrent movement, a first fluid passage extending between said first fluid chamber of said hydraulic cylinder and said spool valve means for connection to said pressure source, a second fluid passage extending from said spool valve means into fluid communication with said poppet seat on one side thereof, a third fluid passage extending from said second fluid chamber of said hydraulic cylinder into fluid communication with said poppet seat on the other side thereof whereby, when said poppet-type piston is moved away from its said engagement with said poppet seat, said second and third fluid passages are in fluid communication with each other, a first pilot pressure passage extending from said pressure source to said second pressure chamber to apply fluid pressure urging said second piston in direction whereby said connecting rod means urges said poppet-type piston away from its said seat-engaging position, and a second pilot pressure passage extending from said second fluid passage to said first pressure chamber means to apply fluid pressure urging said poppet-type piston towards its said seat-engaging position, said spool valve means further comprising fluid throttle means for receiving and limiting fluid flow discharging from said second fluid chamber of said hydraulic cylinder when said first fluid chamber thereof is in fluid communication with said pressure source and said poppet-type piston is in its position away from said seat.

4,697,499

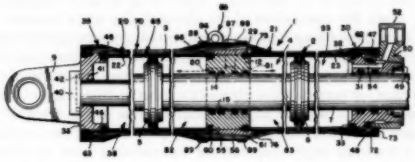
DUAL TANDEM COMPOSITE CYLINDER ASSEMBLY

William Dirkin, Portage; Duane Douglass, Vicksburg; James N. Tootle, and Terry L. Benton, both of Portage, all of Mich., assignors to Pneumo Corporation, Boston, Mass.

Filed Aug. 20, 1984, Ser. No. 642,539

Int. Cl.[4] F01B *7/04*

U.S. Cl. 92—151 **27 Claims**



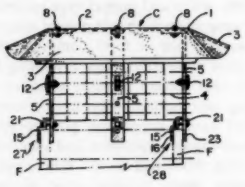
1. A dual tandem composite cylinder assembly comprising a cylinder including a pair of hydraulic chambers in series, said hydraulic chambers having end wall members at the opposite ends of said cylinder and a center gland therebetween, said hydraulic chambers having respective separate first and second circumferential hoop stress windings surrounding same, said first circumferential windings extending axially between opposed surfaces on one of said end wall members and one end of said center gland, and said second circumferential windings extending axially between opposed surfaces on the other of said end wall members and the other end of said center gland, longitudinal tension windings extending substantially the entire length of said cylinder outwardly of said first and second circumferential windings and said center gland and substantially completely covering said first and second circumferential windings and said center gland and said pair of hydraulic chambers therebeneath, and securing means for securing the opposite ends of said longitudinal tension windings to said end wall members at said opposite ends of said cylinder.

4,697,500

ADJUSTABLE CHIMNEY CAP SUPPORT

Durward A. Hisey, St. Louis, Mo., assignor to Hy-C Company, Inc., St. Louis, Mo.

Filed Mar. 27, 1986, Ser. No. 844,871
Int. Cl.[4] F23J *13/08*
U.S. Cl. 98—67 **7 Claims**



2. In a chimney cap of the type designed for installation upon a chimney flue and useful for restraining the entrance of inclement weather, animals, birds, and the like, into the said chimney, said cap being of the type having a cover disposed for mounting a spaced distance above the chimney and incorporating a foraminous member such as a screen arranged below the cover and approximately surrounding and in line above the flue for achieving the aforesaid restraining purposes, the improvement which comprises, a series of braces connecting with the underside of said cover, fastening means securing the braces to said cover, said braces extending approximately downwardly from the cover and for mounting upon the chimney flue, holding means securing the foraminous member to the braces, clamp means securing with the proximate downward ends of the braces for securing the braces and the cover to the chimney flue, each clamp means including an angled member incorporating at least a pair of legs, one leg disposed for biasing against a brace, and the other leg extending downwardly for mounting against an upper side edge of the chimney flue while the approximate lower part of the cooperating brace biases against the opposite edge of the chimney flue, the upper edges of the chimney flue being secured intermediate each pair of combined lower brace portion and the clamp means, a fastener arranged for tightening each clamp means to its proximate brace for installation of the chimney cap upon its associated flue, there being four braces provided connecting with the cover means, at each corner thereof, the clamp means securing through the fastener to each proximate downward portion of the brace for securing the chimney cap to its flue, each clamp means being a double angled member, one angle integrally formed above and staggered with respect to the other angle, the downward angle disposed for cooperating with the connecting brace for securing upon the upper edge of the chimney flue, while the upper angle cooperates with the fastener and brace for tightening of the clamp means to the flue.

4,697,501

STIFFENING SPRING HOSE CLAMP

Charles J. Hupf, Cascade, Wis., assignor to Regal Ware, Inc., Kewaskum, Wis.

Filed Jan. 27, 1986, Ser. No. 822,570
Int. Cl.[4] A47J *31/00*; F16L *11/00*
U.S. Cl. 99—279 **9 Claims**

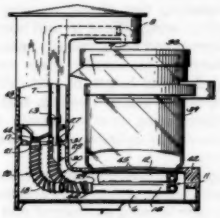
9. In a coffee maker having a cold-water reservoir, a coffee basket and a continuous flow heater for heating and propelling water from said reservoir toward said basket, a device comprising:

a number of flexible conduits of a pre-selected diameter for passing water from said reservoir through said heater and to said coffee basket,

a number of relatively inflexible conduits having a diameter which allows insertion of said inflexible conduits into the ends of said flexible conduits,

areas of overlap created by the insertion of said inflexible conduits into the ends of said flexbile conduits,

a number of coil springs having a diameter greater than that of said flexible conduits each of which surrounds one of said flexible conduits for a major portion of its length for supporting said flexible conduit, each said coil spring



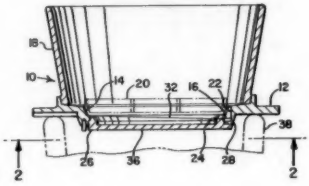
having at least three relatively closely spaced helical clamping turns of a relatively reduced diameter located where said coil springs surround said areas of overlap and securing said flexible conduits to said inflexible conduits, each turn of each said coil spring being substantially circular before said coil spring is installed.

4,697,502

APPARATUS FOR MAKING VARIED STRENGTH BEVERAGES

Philip H. English, P.O. Box 1605, Avon, Colo. 81620, and Anthony D. Szpak, Parma, Ohio 44134

Continuation-in-part of Ser. No. 764,930, Aug. 12, 1985, abandoned. This application Sep. 23, 1985, Ser. No. 778,782
Int. Cl.[4] A47J *31/02, 31/10*
U.S. Cl. 99—299 **17 Claims**



1. A coffee making apparatus for making small quantities of beverage and adapted to be positioned over a serving cup or other container comprising

a mounting plate having a center opening therein and a support shoulder formed on a wall of said opening,

an apertured adjustment ring in rotary engagement with said mounting plate below said support shoulder,

said mounting plate having a by-pass slot formed in said shoulder and in a connecting portion of said wall positioned radially beyond said shoulder,

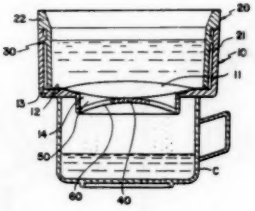
said adjustment ring having a varied height vertically extending outer wall formed therein on the periphery thereof, which wall is of a size and construction to close the end of said by-pass slot when said adjustment ring is moved to position a taller part of said outer wall against the outlet of said by-pass slot, said shoulder being adapted to receive a coffee container and filter unit thereon.

4,697,503

DRIP DRINK MAKER

Ryuichiro Okabe, Tokyo, and Yoshitaka Yanagi, Tanashi, both of Japan, assignors to Ajinomoto General Foods, Tokyo, Japan

Filed Feb. 3, 1986, Ser. No. 825,411
Claims priority, application Japan, Feb. 5, 1985, 60-15114
Int. Cl.[4] A47J *31/02*
U.S. Cl. 99—306 3 Claims



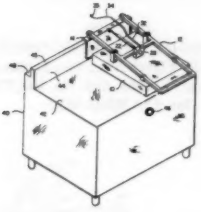
1. A drip drink maker comprising a cup-shaped receiver containing a drip wall as the bottom surface of said cup-shaped receiver, said drip wall containing a plurality of apertures and present in the shape of a hemisphere protruding toward the upper opening of said cup-shaped receiver, a pack containing drippable coffee or tea components positioned on said drip wall to form a drip space between said pack and the greater part of said drip wall and a unit into which said cup-shaped receiver will fit providing a space to hold a liquid which drips from said cup-shaped receiver.

4,697,504

HINGED TOP GRILL ARRANGMENT

Richard Keating, 715 S. 25th Ave., Bellwood, Ill. 60104

Filed Dec. 6, 1985, Ser. No. 806,092
Int. Cl.[4] A47J *27/62*
U.S. Cl. 99—331 3 Claims



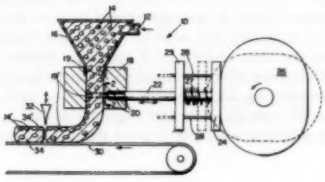
1. A top grill assembly comprising:
U-shaped support means adapted for removable attachment to the rear housing of a cooking grill without the use of fasteners;
a top grill;
a supporting handle;
mounting means pivotally mounting said supporting handle to said top grill near the forward end of said top grill;
captivating means permitting limited angular movement between said supporting handle and said top grill near the rearward end thereof;
wherein said mounting means and said captivating means comprise U-shaped brackets affixed to the surface of said top grill and wherein said supporting handle has a generally U-shaped configuration with a pair of elongated legs, said legs being pivotally mounted to said support means at their open ends and pivotally mounted to said mounting means near their closed ends; and
gas cylinder means coupled between said support means and said supporting handle for substantially offsetting the weight of said top grill.

4,697,505

APPARATUS FOR INCREASING THE VISIBILITY OF DISCRETE MORSELS CONTAINED WITHIN A BAKED FOOD PRODUCT

Richard A. Brewer, Cincinnati, Ohio; Robert H. Merk, Harrison, and Gary J. Orndorff, Sunman, both of Ind., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 748,517, Jun. 25, 1985, Pat. No. 4,643,904.
This application Sep. 29, 1986, Ser. No. 912,435
Int. Cl.[4] A21C *9/04*; A23P *1/00*
U.S. Cl. 99—450.1 24 Claims



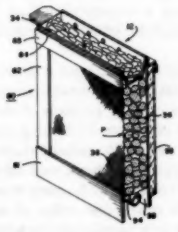
1. An apparatus for making individual dough preforms, each containing discrete morsels and having a pre-selected peripheral area wherein the concentration of said morsels is higher than the remainder of said preform, said apparatus comprising:
(a) means for forming a continuously-moving dough rope containing randomly-distributed morsels, said continuously-moving dough rope having a pre-selected peripheral area and a remainder area;
(b) means for penetrating said continuously-moving dough rope to engage and transversely move a portion of said randomly-distributed morsels contained within said remainder area of said continuously-moving dough rope to said pre-selected peripheral area of said continuously-moving dough rope, whereby said pre-selected peripheral area of said continuously-moving dough rope has a higher concentration of said morsels than said remainder area of said continuously-moving dough rope; and
(c) means for cutting said continuously-moving dough rope into said individual dough preforms.

4,697,506

TRAY FOR GENERATING FOOD FLAVORING SMOKE

John S. Ducate, Jr., Columbia, S.C., assignor to The Ducane Company, Columbia, S.C.

Filed Aug. 13, 1986, Ser. No. 896,158
Int. Cl.[4] A23B *4/04*
U.S. Cl. 99—482 20 Claims



1. A tray for flavoring food by burning woodchips and the like, said tray comprising:
an elongated base;

a pair of sidewalls extending along and outwardly from said base in opposing relation to define a container for supporting a supply of said woodchips from at least three sides, said sidewalls diverging outwardly from said base relative to an imaginary central plane extending through a longitudinal axis of said base and perpendicular to a surface of said base, and each of said sidewalls having a plurality of apertures at spaced intervals along the length of the sidewall; and,

means for mounting said tray with its base above and in close proximity to a source of heat for burning said supply of woodchips when supported in said container with the sidewalls of said tray extending away from said heat source;

the number, size and location of said apertures and the divergence of said sidewalls being such that when said tray is positioned with its base above and in close proximity to said heat source and with its sidewalls extending away from said heat source, said apertures permit sufficient direct heating of said woodchips to cause burning thereof by smoldering and the solid portions of said base and sidewalls provide sufficient shielding of said woodchips from said heat source to prevent flaming thereof.

4,697,507

APPARATUS FOR PREPARATION OF A PROCESSING FOOD

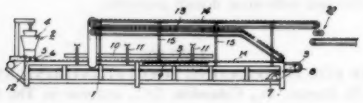
Kousuke Nagasaki, Osaka, Japan, assignor to Kabushiki Kaisha Irifune, Osaka, Japan

Filed Dec. 30, 1985, Ser. No. 814,915

Claims priority, application Japan, Oct. 26, 1985, 60-239772; Oct. 26, 1985, 60-239773; Oct. 26, 1985, 60-239774

Int. Cl.[4] A23B *4/00;* **A23L** *1/00;* **A23D** *1/00*

U.S. Cl. 99—483 **8 Claims**



1. An apparatus for preparation of a processing food material comprising:

means for extruding a continuous sheet of a liquid processing food material capable of gelating by heat,

a conveyor having a conveyor surface for receiving and feeding the extruded continuous sheet of liquid processing food material,

oil applying means supplied with a source of edible oil for coating edible oil on the conveyor surface,

heating means for causing gelation of the processing food material on the conveyor by heating said conveyor, and

cutting means for cutting the gelated sheet of material fed by said conveyor to a fixed shape, said cutting means including of a pair of rollers which rotate around axis shaftlines parallel to each other, one roller of said pair of rollers being provided with parallel grooves intersecting perpendicularly with the axis shaftline at the periphery of the roller, while the other roller being provided with protruding portions which register with said grooves respectively at the periphery of the roller.

4,697,508

COOLING AUGER

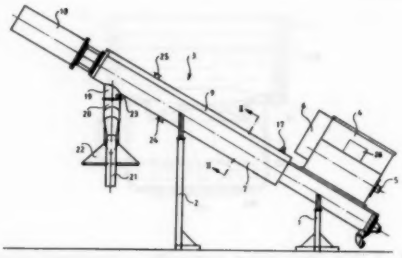
Ottmar Tallafus, Am Himmelreich 14, 6967 Buchen 1, Fed. Rep. of Germany

Filed Nov. 12, 1985, Ser. No. 797,163

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3441425

Int. Cl.[4] A23B *4/06;* **F25D** *13/06*

U.S. Cl. 99—517 **14 Claims**



1. An apparatus for transporting and cooling sensitive and perishable goods especially sliced raw vegetables and raw lettuce said apparatus comprising an auger, a feeding hopper arranged at one end of said auger, and a discharge structure at the other end of said auger, said auger having a transport screw disposed in a trough-like housing, a heat insulating jacket disposed around said trough-like housing, a heat insulated lid disposed on said trough-like housing in spaced relationship from said transport screw with a coolant injection pipe disposed in the space between said transport screw and the lid of said trough for the introduction of a cooling fluid into said auger, and having coils with bulged rounded outer edges being so arranged in said trough that said rounded outer edges are spaced from the trough walls and the pitch of the coils of the transport screw in said trough being substantially larger than in said feeding hopper into which the transport screw extends.

4,697,509

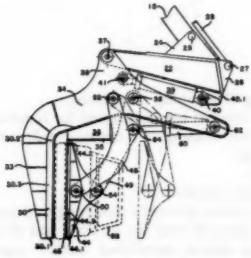
AUTO BODY CRUSHING DEVICE

Roy E. LaBounty, 1607 Eighth Ave., Two Harbors, Minn. 55616

Filed Apr. 7, 1986, Ser. No. 848,770

Int. Cl.[4] B30B *9/32*

U.S. Cl. 100—233 **19 Claims**



9. A crusher assembly for compressing automobile bodies and the like for attachment to the boom structure and hydraulic system of a mobile power source and the like, comprising:

a. a rigid elongate frame having a first end portion,

b. securing means for attachment of the frame to the boom structure and hydraulic system of the mobile power source,

c. a panel shaped fixed jaw having an exterior confronting

surface, the fixed jaw having a proximal end affixed to the first end portion of the frame and extending therefrom, the fixed jaw also having a distal end remote from the frame, and the fixed jaw having side ends between its distal and proximal ends,

d. a panel shaped operable jaw, having an exterior confronting surface, the operable jaw having a proximal end adjacent to the frame and extending therefrom the a distal end of the operable jaw, the operable jaw also having side ends between the proximal end and distal end, and including linkage means pivotally connecting the operable jaw to the frame so that the operable jaw is suspended therefrom and so that the confronting surface of the movable jaw faces the confronting surface of the fixed jaw, the linkage providing for swinging of the operable jaw toward and away from the fixed jaw and providing for maintaining the exterior confronting surface of the fixed jaw in a substantially parallel relationship with the exterior confronting surface of the operable jaw during movement of the operable jaw, and

e. drive means connected to the linkage means for operating the operable jaw.

4,697,510

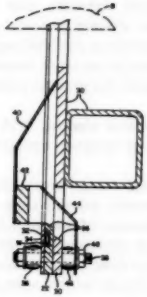
CONTAMINATION DEFLECTOR SYSTEM FOR BALE BINDING MACHINES

Albert E. Cranston, III, Wilsonville, and Mark L. Kudlicka, Lake Oswego, both of Oreg., assignors to Cranston Machinery Co., Inc., Oak Grove, Oreg.

Filed Dec. 22, 1986, Ser. No. 944,171

Int. Cl.[4] B65B *13/06*

U.S. Cl. 100—14 **7 Claims**



1. In a binding machine for binding bales containing escaping contaminating materials, a guide track extending under and around the bale to guide a band around the bale for binding the bale, said guide track being normally closed but arranged to open for stripping the band out of the guide track when the band is tightened around the bale, a pair of resilient contamination deflectors extending along the bottom portion of the guide track extending under the bale, said deflectors comprising a lower deflector mounted on one side of the guide track and having an upper free edge portion inclined over said bottom portion of the guide track, and an upper deflector mounted on the opposite side of said bottom portion of the guide track and having an upper free edge portion inclined in the opposite direction over the guide track and over said lower deflector.

4,697,511

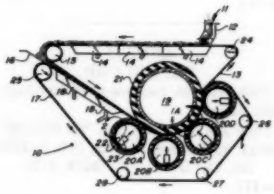
COMPOSITE ROLL COVERING FOR EXPRESSING MACHINES

Steven S. Davis, Farmington; Max A. Mueller, Centerville, and Kenneth F. Janecek, Salt Lake City, all of Utah, assignors to Envirotech Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 653,273, Sep. 24, 1984, abandoned, which is a division of Ser. No. 341,728, Jan. 26, 1982, Pat. No. 4,475,453, which is a continuation-in-part of Ser. No. 234,610, Feb. 17, 1981, abandoned. This application Jul. 8, 1985, Ser. No. 753,033

Int. Cl.[4] B30B *5/04, 13/00*

U.S. Cl. 100—37 **13 Claims**



1. In a dewatering system for dewatering wet solids having a pair of dewatering belts, at least one of which is porous, which are squeezed between a large primary drum having a unitary elastically deformable covering and one or more smaller satellite pressure-applying rolls, the improvement comprising satellite rolls with a composite elastically deformable covering layer with an impervious surface skin and having a graded deformability across said layer such that at least the impervious surface skin of said layer in contact with one of said dewatering belts is less deformable than an inner subjacent stratus of the layer in contact with said surface skin, said composite covering being more deformable than the resilient covering on said primary drum, said improvement extending the surface area contact between said drum and said rolls.

4,697,512

SHEET GRIPPER SYSTEM FOR A PRINTING PRESS

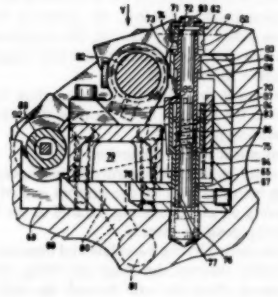
Claus Simeth, Offenbach am Main, Fed. Rep. of Germany, assignor to M.A.N.-Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,827

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1984, 3445886

Int. Cl.[4] B41F *9/00*

U.S. Cl. 101—142 **20 Claims**



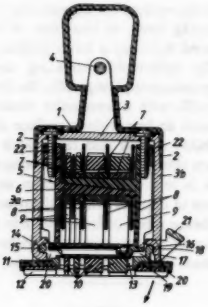
1. A gripper system for conveying successive sheets by the front edges through the printing zone of a printing press having an impression cylinder supported for rotation on a machine column, comprising means for rotating the impression cylinder

through a machine cycle including a printing zone (α), a sheet supply zone (β), a sheet discharge zone (β_1) and inactive zone (γ), a plurality of regular sheet grippers mounted on the impression cylinder with spaces between the grippers, in which spaces cooperating transfer grippers engage the sheet edge during sheet supply and delivery to the impression cylinder, characterized in that additional sheet grippers are disposed between the regular grippers, means for moving said additional sheet grippers into the gripper plane in the between-gripper spaces, where they hold the front edge of the sheet as is passes through the printing zone (α) and means for moving the additional sheet grippers out of the gripper plane as the additional grippers pass through the sheet discharge zone (β_1) and the inactive zone (γ).

4,697,513
BELT STAMP

Ernst Faber, Wels, Austria, assignor to Walter Just Gesellschaft m.b.H, Wels, Austria

Filed Jan. 24, 1986, Ser. No. 821,959
Claims priority, application Austria, Feb. 5, 1985, 322/85
Int. Cl.[4] B41J *1/20*; B41K *1/10*
U.S. Cl. 101—111 **6 Claims**

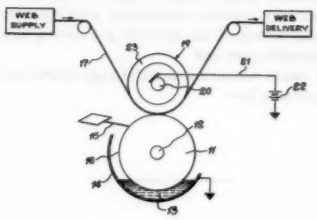


1. In a belt stamp comprising
a housing having an open bottom end;
a baseplate defining a window and adapted to be held in a position closing the open bottom end of the housing;
hinge means connecting the baseplate to the bottom end of the housing and permitting the baseplate to be pivoted from the closing position into an open position;
a stamping belt assembly comprising a plurality of adjacent stamping belts each carrying type adapted to extend in an operating position through the window in the baseplate in the closing position thereof, the stamping belt assembly being mounted in the housing for adjustment relative thereto in a direction normal to the base plate in the closing position thereof, and
set screw means for adjusting the stamping belt assembly relative to the housing in the normal direction to assume the operating position,
the improvement which comprises
a half-bushing having an inwardly facing opening, the half-bushing being carried by the bottom end of the housing and having an axis extending parallel to the base plate in the closing position thereof,
a hinge pin carried by the baseplate and disposed thereabove and parallel thereto, the hinge pin being pivoted in the half-bushing about the axis thereof, the half-bushing and hinge pin constituting the hinge means and the stamping belt assembly at least partly covering the inwardly facing opening when the baseplate is in the closing position to retain the hinge pin in the half-bushing in the operating position of the stamping belt assembly.

4,697,514
METHOD AND APPARATUS FOR TRANSFERRING INK IN GRAVURE PRINTING

Harvey F. George, West Hempstead, and Robert H. Oppenheimer, Glen Cove, both of N.Y., assignors to Gravure Association of America, New York, N.Y.

Continuation of Ser. No. 745,205, Nov. 26, 1976, abandoned, which is a continuation of Ser. No. 247,217, Apr. 24, 1972, abandoned, which is a continuation of Ser. No. 75,731, Sep. 25, 1970, abandoned, which is a continuation of Ser. No. 812,503, Dec. 31, 1968, abandoned, which is a continuation of Ser. No. 493,808, Oct. 7, 1965, abandoned. This application Sep. 2, 1980, Ser. No. 183,401
Int. Cl.[4] B41F *9/00*
U.S. Cl. 101—170 **14 Claims**



1. In gravure printing with highly fluid liquid ink, a method for eliminating skipped dots, which result from inadequate transfer of the highly fluid liquid ink present in gravure printing cells of a rotating gravure printing cylinder onto the surface of a dielectric substrate due to roughness and depressions in the surface of the dielectric substrate, by increasing the accessibility to the highly fluid liquid ink in the gravure printing cells at the printing nip and thereby improve the print quality of the ink deposited upon the surface of the dielectric substrate, comprising the steps of:
urging the dielectric substrate into substantial pressure contact with the rotating gravure printing cylinder by means of an impression roll backing the dielectric substrate, the substantial pressure contact occurring at the printing nip between the gravure printing cylinder and the impression roll;
generating a controlled electric field at the printing nip between the gravure printing cylinder and the impression roll;
inducing a controlled charge on the highly fluid liquid ink present in the gravure printing cells at the printing nip as a result of the presence of the controlled electric field, the elecrostatic forces resulting from the induced charge and controlled electric field being sufficient to overcome the surface tension forces which normally hold the highly fluid liquid ink in the gravure printing cells with a concave meniscus and thereby distort the normal concave surface to provide a bulging in the surface of the ink adjacent the boundary walls of the gravure printing cells so that the surface of highly liquid fluid ink extends above the peripheral surface of the gravure printing cylinder while the highly fluid liquid ink maintains continuity in its configuration in the gravure printing cells to provide improved contact between the surface of the highly fluid liquid ink and the depressed areas in the surface of the dielectric substrate so that the highly fluid liquid ink more readily contacts those portions in the surface of the dielectric substrate which would normally not be reached by the configuration of the highly fluid liquid ink present in the gravure cells of conventional gravure printing cylinders.

4,697,515
ROTARY MULTICOLOR PRINTING MACHINE FOR SIMULTANEOUS RECTO-VERSO PRINTING

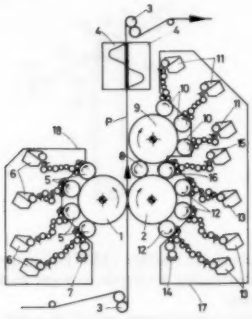
Albrecht J. Germann, Würzburg, Fed. Rep. of Germany, assignor to De la Rue Giori S.A., Switzerland

Filed Oct. 3, 1986, Ser. No. 914,773

Claims priority, application Switzerland, Oct. 15, 1985, 4 439/85

Int. Cl.[4] B41F *5/16*

U.S. Cl. 101—179 **3 Claims**



1. A rotary multicolor printing machine for simultaneous recto-verso printing, especially for printing the safety background on backnotes, having a first blanket cylinder (1) in contact with several offset plate cylinders (5) each inked by a particular inking unit (6), a second blanket cylinder (9) in contact with several selective color inking cylinders (10) each inked by a particular inking unit (11), said second blanket cylinder also being in contact with a plate cylinder (8), a collect printing plate carried by said plate cylinder, and a third blanket cylinder (2) pressed agaonst said first blanket cylinder (1) said third blanket cylinder resting against said plate cylinder (8) carrying said collect printing plate, said first and third blanket cylinders (1,2) forming a nip for paper (p) which is to be printed on both sides and which runs through said nip between said blanket cylinders, said third blanket cylinder (2) also being in contact with several offset plate cylinders (12) each inked by a particular inking unit (13), and a further plate cylinder (16) arranged between said second and third blanket cylinders (9,2) said further plate cylinder (16) being linked by an inking unit (15) and being convertible so as to be settable in either of two different working positions, said further plate cylinder in one working position resting against said third blanket cylinder (2) and being moved away from said second blanket cylinder (9) and in the other working position resting against said second blanket cylinder (9) and being moved away from said third blanket cylinder (2).

4,697,516
MOUNTING MEANS FOR PLATE CYLINDERS OF A PRINTING MACHINE HAVING REPLACEABLE SLEEVELIKE PLATE CYLINDER SHELLS

Anton Rombout, Oosterbeek, Netherlands, assignor to Windmöller & Hölscher, Lengerich, Fed. Rep. of Germany

Filed Dec. 4, 1985, Ser. No. 804,434

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1984, 3444192; Jan. 7, 1985, 3500319

Int. Cl.[4] B41F *13/10, 13/20*

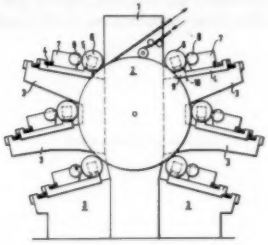
U.S. Cl. 101—216 **3 Claims**

1. Apparatus for rotatably mounting plate cylinders on a printing machine, the plate cylinders including replaceable sleevelike plate cylinder shells removably carried on the plate cylinders, said apparatus comprising:

(a) a frame;

(b) first and second bearing support means carried on said frame in laterally spaced relationship and including bearing means for rotatably supporting respective ends of a plate cylinder, said second bearing support means including a bearing support bracket;

(c) carriage means mounted on said frame for removably supporting and carrying said bearing support bracket, said carriage means including track means for linearly slidably carrying said bearing support bracket in a direction parallel to the axis of the plate cylinder, pivotable support means pivotally carried by said frame for supporting said track means, and locking means for releasably locking said track means to said frame, said bearing support means being linearly axially movable away from the plate cylinder to withdraw said second bearing support means from the plate cylinder and being pivotable to carry said second bearing support means out of axial alignment with the plate cylinder to permit a sleevelike plate cylinder shell to be applied to and removed from the plate cylinder; and



(d) cylinder supporting means carried by said frame and positioned adjacent said first bearing means for supporting the plate cylinder in substantially its orientation prior to removal of said second bearing support means while a plate cylinder shell is being removed from or installed on the plate cylinder, wherein said cylinder supporting means includes hydraulic piston-cylinder means positioned on each side of said first bearing means, said piston-cylinder means each including piston rod means to carry respective supporting members that contact and support the plate cylinder on respective upper and lower sides thereof to prevent pivotal movement of the plate cylinder about said first bearing means.

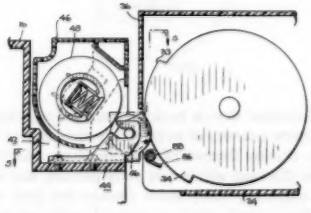
4,697,517
INKING APPARATUS FOR A MAILING MACHINE

Arnold Fassman, Westport, and William Salancy, Norwalk, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Sep. 6, 1985, Ser. No. 773,152

Int. Cl.[4] B41F *1/46, 31/14*

U.S. Cl. 101—348 **2 Claims**



1. In a mailing machine having a postage meter removably mounted therein, the postage meter having a rotatable printing drum which carries a postage impression printing die thereon and a guard member extending laterally across the printing die for protecting said printing drum and to prevent unauthorized

access thereto, the mailing machine also including an ink supply cartridge having a supply roller, and a transfer roller for transferring ink from the ink supply cartridge to the printing die, and means mounting said supply roller and said transfer roller both for rotation about the axis of said supply roller and said transfer roller and for lateral displacement toward and away from said printing drum, the improvement comprising:

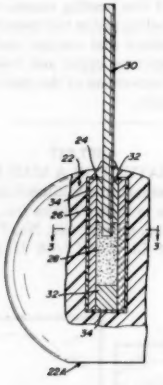
a generally U-shaped member mounted on said mounting means and having a pair of oppositely facing ears connected by a bridge, said ears having curved cam surfaces formed along the sides thereof remote from said supply roller for sliding contact by said guard member during installation and removal of said meter, wherein said guard member causes said transfer roller and said ink supply roller to be translated away from said printing drum during said installation and removal, thereby preventing said transfer roller from depositing ink on said guard member.

4,697,518

MOLDED FIREWORKS

Nam S. Lau, and Yick J. Lau, both of Hong Kong, Hong Kong, assignors to Phantom Firework Manufacturing Company Limited, Hong Kong

Filed Feb. 5, 1987, Ser. No. 11,071
Int. Cl.[4] F42B *4/00*
U.S. Cl. 102—358 **10 Claims**



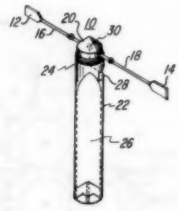
1. A pyrotechnic device having a maximal explosive effect with a minimum quantity of an explosive composition comprising a body portion formed of a plastic foam material and a hollow tube disposed within said body portion, said tube containing an explosive composition therein and into which an elongated fuse extends, packing material enclosing said explosive composition within said tube and sealing means in the form of a coating covering said tube for sealing any openings therein and any openings in the interfaces between said tube, said packing means and said fuse, said sealing means providing a surface to which said plastic foam body is molded, said plastic foam body having a predetermined outer shape.

4,697,519

SMART MINE

Joseph A. Rice, Jr., McKinney; Douglas D. McGregor, Plano; Forrest D. Colegrove, Dallas, and Bela Marton, Allen, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 5, 1985, Ser. No. 762,480
Int. Cl.[4] F42B *22/04*
U.S. Cl. 102—406 **7 Claims**



1. An anti-submarine warfare (ASW) mine comprising;

a. a housing including a torpedo compartment and a head compartment;

b. said torpedo compartment including a port having a removable cover,

c. a port cover removing means mounted in said housing,

d. said port cover removing means operatively connected to the port cover for removing said port cover and flooding the torpedo compartment, and

e. a spring between said torpedo compartment and head compartment for selectively separating the head compartment from said torpedo compartment,

f. sensor support electronics operatively mounted in the head compartment; and

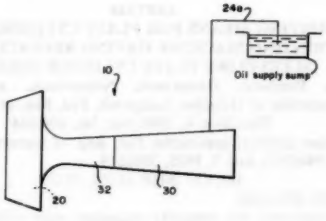
g. a plurality of magnetic sensor means exteriorly attached to the housing and operatively connected to the support electronics for sensing the Earth's magnetic field, whereby the sensor support electronics controls the operation of the magnetic sensor means, detects variations in the Earth's magnetic field resulting from the presence of ferromagnetic bodies and produces mine influence signals.

4,697,520

FOG OIL SMOKE GENERATOR

Walter L. Brassert, Belmont, and Arnold M. Heitmann, Swampscott, both of Mass., assignors to Northern Research & Engineering Corp., Woburn, Mass.

Filed Aug. 11, 1986, Ser. No. 895,256
Int. Cl.[4] F42B *13/44*
U.S. Cl. 102—334 **5 Claims**



1. A smoke generator, comprising:

a disc;

means for supplying oil to a surface of said disc;

means for rotating said disc to cause oil supplied to said surface to remove from said disc in droplets;

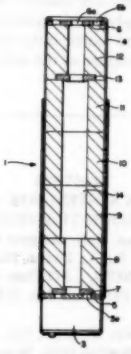
means for transforming such oil droplets into a vapor; and
means for propelling such vapor in a given direction; wherein
said disc has an outer rim, and a central, cylindrical portion;
said cylindrical portion is of diverging configuration, outwardly toward said rim;
said cylindrical portion has a circumferential wall;
said wall and said rim are joined through a smoothly radiused juncture;
said rim flares away, and radially outward, from said cylindrical portion;
said cylindrical portion has an end wall which cooperates with said circumferential wall to define said portion as a cup-shaped reservoir;
said oil supplying means comprises a conduit for conducting oil therethrough and expelling oil therefrom into said reservoir; and
said transforming means comprises a source of heat.

4,697,521

METHOD FOR OPAQUING VISIBLE AND INFRARED RADIANCE AND SMOKE-PRODUCING AMMUNITION WHICH IMPLEMENTS THIS METHOD

André Espagnacq, and Gerard D. Sauvestre, both of Bourges, France, assignors to Etat Francais, Paris, France

Filed Jul. 27, 1983, Ser. No. 517,940
Claims priority, application France, Jul. 27, 1982, 82 13055
Int. Cl.[4] C06D *3/00*
U.S. Cl. 102—334 **12 Claims**



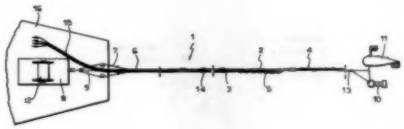
1. A method for shielding radiance emitted by a target in the visible spectrum and the infrared spectrum at wavelengths between about 0.4 and 14 μm comprising:
producing a first hot aerosol to shield the target primarily through diffusion in the visible spectrum and primarily through emission in the infrared zone;
producing a second hot aerosol substantially comprising hot carbon particles to shield the target primarily through diffraction, said hot carbon particles having diameters substantially between 1 and 14 μm.

4,697,522

DRAWN MINE-REMOVING APPARATUS

Karl-Heinz Groschupp, Seevetal, Fed. Rep. of Germany, and Simon P. Vreeke, CK s'Gravenpolder, Netherlands, assignors to Kabelwerke Friedrich C. Ehlers, Hamburg, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,545
Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3522197
Int. Cl.[4] B41B *1/04*
U.S. Cl. 102—402 **9 Claims**



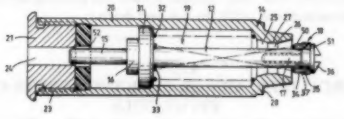
1. In a mine-removing apparatus to be drawn behind a mine-sweeping boat and comprising a pulling cable, at least one sound generator connected to said pulling cable and adapted for igniting acoustic mines, and electrode-carrying floating cables or an electrically-conductive floating cable loop for igniting magnetic mines, the improvement wherein said pulling cable has a first portion close to the boat, at least said first portion and said floating cables extending as a common strand; said floating cables have a trailing end and said pulling cable has a length extending in operation beyond said trailing end; and said pulling cable and said floating cables are guided for limited longitudinal displacement relative to each other.

4,697,523

COMPRESSED GAS POWERED AMMUNITION FOR GUNS

Michael E. Saxby, Stratford-Upon-Avon, England, assignor to Hilvenna Limited, Warwickshire, England

Filed Dec. 26, 1985, Ser. No. 813,062
Claims priority, application United Kingdom, Jan. 11, 1985, 8500706; Jan. 31, 1985, 8502492; Mar. 20, 1985, 8507225; Aug. 10, 1985, 8520129
Int. Cl.[4] F42B *5/02*; F41B *11/08*
U.S. Cl. 102—440 **17 Claims**



1. A rechargeable ammunition cartridge comprising:
(a) a hollow pressure casing having a rear end and defining a gas storage space to hold compressed gas therein;
(b) a discharge passage in a front part of said casing and open to said gas storage space;
(c) an actuation passage extending into said casing and open at the rear of said casing;
(d) a valve opening disposed at a front end of said actuation passage and open to said gas storage space; and
(e) a valve member in said casing and having a normal position wherein it closes said valve opening at one end thereof and blocks said discharge passage with another portion thereof,
(f) said valve member is movable bodily forwardly from said normal position to open both said valve opening and said discharge passage to allow gas to escape from the pressure casing directly through both of said passages; and
(g) said valve member is dischargeable from the casing via the discharge passage.

4,697,524
AFTER-FIRING SAFETY

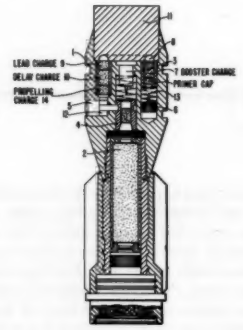
Horst Penner, and Ernst Jensen, both of Fürth, Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Jan. 16, 1986, Ser. No. 819,290

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1985, 3501450

Int. Cl.[4] F42B *13/20*

U.S. Cl. 102—498 **8 Claims**



1. An arming delay mechanism for training ammunition, fired through the central barrel of a full-caliber dummy projectile, which comprises a fuze which, upon impact of the training ammunition on a target, is movable to an operative position where the fuze ignites an active charge, a locking pin ejectable perpendicular to an access of the training ammunition, said pin fixing the fuze in an inoperative position at least as long as the training ammunition is located within the barrel; said locking pin being inserted, ejectable by gas pressure, in a cavity which is in communication with a propelling charge; and the propelling charge being connected to an ignition system operating with delay, said system being initiated upon firing of the training ammunition; said ignition system comprising an igniting charge and a striker pin located in a first bore extending parallel and offset from longitudinal axis of the training ammunition, a delay charge and the propelling charge located in a second bore arranged in parallel to the axis and offset diametrically from the first bore, and channel means for placing the first bore in communication with the second bore.

4,697,525
SUBCALIBER, ARMOR PIERCING PENETRATOR PROJECTILE

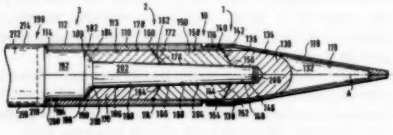
Jürgen Böcker, Oberhausen; Hans W. Luther, Kaarst; Peter Wallow, Düsseldorf, and Horst Fritsch, Meerbusch, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 476,408, Mar. 17, 1983. This application Oct. 10, 1986, Ser. No. 917,634

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1982, 3209593

Int. Cl.[4] F42B *11/06*

U.S. Cl. 102—518 **5 Claims**



1. An improved subcaliber fin-stabilized penetrator projectile of equal diameter along the whole length of its cylindrical shape and consisting of high density ductile heavy metal, selected from the group consisting of depleted uranium or a sintered alloy with high percentage of depleted uranium or tungsten, the latter in the range of 90–98%, which has a steel ballistic hood coaxially mounted on the front end thereof and a plurality of frontal cores mounted one behind the other in an axial direction behind said ballistic hood, and a main penetrator core arranged behind said frontal cores;

a cylindrical casing of said heavy metal having a smooth external surface being operatively detachably connected to said ballistic hood and extending from said hood to a frontal region of the main penetrator core and whose outer diameter is equal to the outer diameter of the main penetrator core, said plurality of frontal cores being operatively mounted partially in said cylindrical casing and partially in said ballistic hood, the improvement comprising in combination the main penetrator core having a cylindricl front end extension of smaller diameter with which the casing is rigidly attached;

a transition piece attached to said front end extension whose frustoconical surface is tapered towards its frontal portion;

a frustoconical stem tapered towards its frontal portion attached to said transition piece;

the frontal cores are equal in diameter and have an axially centered bore and recess corresponding with the diameter of the circumference of said stem;

the frontal cores having, on the rearward side, frustoconical rear faces each with a rearward opening frustoconical surface of equal slope;

said frontal cores, with the exception of the fore-most frontal core, as well as the transition piece on the front end extension of the main penetrator core, having the same slope on the front of each frustoconical surface of the front frustoconical face as on the frustoconical rear face;

the foremost core element having a part spherically formed front face;

the ballistic hood arranged near the fore-most frontal core being screwlike detachably mounted and holding a plurality of said frontal cores together against one another inside said casing in a play-free manner, with the frontal cores inner surfaces snugly fitted against the outside surface of the stem, and said cores outer surfaces snugly fitted against the inner surface of the said casing.

4,697,526
ARTICULATION SYSTEM FOR ARTICULATED DEPRESSED-FLOOR TRAMWAY CARRIAGES

Umberto Vigliani, Milan, Italy, assignor to Officina Meccanica della Stanga O.M.S. S.p.A., Padua, Italy

PCT No. PCT/EP85/00254, § 371 Date Jan. 17, 1986, § 102(e) Date Jan. 17, 1986, PCT Pub. No. WO85/05602, PCT Pub. Date Dec. 19, 1985

PCT Filed May 28, 1985, Ser. No. 826,150

Claims priority, application Italy, May 30, 1984, 21163 A/84

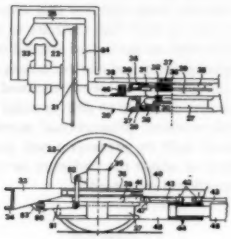
Int. Cl.[4] B61D *17/20*

U.S. Cl. 105—3 **14 Claims**

1. In a suspension system for a pair of articulated depressed-floor railway carriages, of the type wherein adjacent car ends are pivotally interconnected by means of a drawbar, each of said ends is supported by a single-axle bogie, and each of said bogie comprises a dropped-center axle and a pair of wheels mounted for free independent rotation thereon, the improvement comprrising

(a) a single resilient suspension element interposed between said car body and said axle at the center thereof,

(b) means for permitting the axle to pivot about a vertical axis relative to said car body, and



(c) a constraint for preventing rotation of said axle around the rotational axis of said wheels.

4,697,527

DRIVE UNIT FOR A RAIL VEHICLE

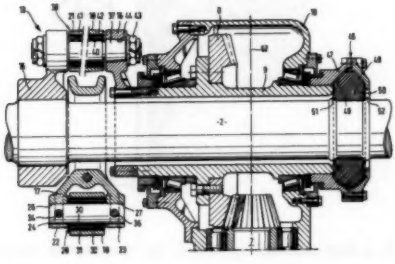
Johann Eichinger, Vetterstetten, Fed. Rep. of Germany, assignor to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany

Continuation of Ser. No. 659,376, Oct. 10, 1984, abandoned. This application Sep. 22, 1986, Ser. No. 910,316

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1983, 3337695; Apr. 21, 1984, 8412522

Int. Cl.[4] B61C *17/00*

U.S. Cl. 105—133 **20 Claims**



1. In a drive unit mounted on a frame of a rail vehicle having at least one wheel-set axle, said drive unit including a motor-gearing unit supported on said at least one wheel-set axle, said motor-gearing unit having a drive motor with an output shaft and at least one gear unit with an input shaft which is coupled with said output shaft of said drive motor, said gear unit having an output shaft in the form of a hollow drive shaft which substantially concentrically surrounds said wheel-set axle, and elastic torque transmitting coupling means for coupling said hollow drive shaft to said wheel-set axle, the improvement comprising wherein elastic bearing means separate from said elastic torque transmitting coupling means are provided between said hollow drive shaft and said wheel-set axle for transmitting a weight force of said motor-gearing unit to said wheel-set axle while simultaneously facilitating a relative inclination between an axis of said wheel-set axle and an axis of said hollow drive shaft, said elastic bearing means being spaced along the length of said wheel-set axle from said elastic torque transmitting coupling means, and wherein guide lever means are provided between said frame and said motor-gearing unit for providing further support for said motor-gearing unit in a substantially horizontal direction laterally of the longitudinal axis of said rail vehicle to counter massacceleration forces, torque and tilting moments acting on said motor-gearing unit and thereby restrict the application of force, other than said weight force, on said elastic bearing means.

4,697,528

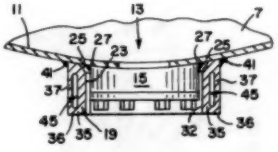
RAILWAY TANK CAR WITH PROTECTIVE DEVICE FOR PROTRUSION

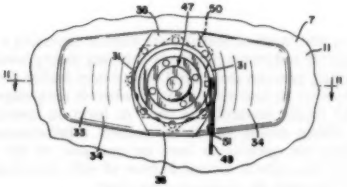
Richard E. Rehbein, Valparaiso, Ind., assignor to Pullman Rail Leasing Inc., Chicago, Ill.

Filed Apr. 18, 1986, Ser. No. 853,478

Int. Cl.[4] B61D *5/00*; **F16K** *35/00*

U.S. Cl. 105—358 **25 Claims**





1. A railway tank car including

a tank body having an outer surface and a protrusion thereon, and

a protective device for protective said protrusion against damage from impacts, said protective device comprising:

a generally cylindrical inner wall means completely surrounding and spaced from the protrusion, said wall means engaging the surface of the tank body and extending generally away therefrom, said wall means having a first end portion engaging the tank body and a second end portion defining an access aperture in the protective device for providing access to the protrusion;

an outer deflection portion connected with the second end portion of the wall means, said deflection portion extending radially outwardly and slopingly toward the tank body, said deflection portion engaging the outer surface of the tank body for deflecting impacts and protecting the protrusion;

the inner wall means having an outer surface portion facing generally away from the protrusion, and

the outer deflection portion having an inner surface portion facing inwardly of the protective device;

the outer surface of the tank body, the outer surface portion of the inner wall means, and the inner surface portion of the outer deflection portion defining therebetween an internal space extending completely around the protrusion within the protective device whereby the protective device is lightweight and may be mounted over the protrusion without cutting into the tank body.

16. The invention according to claim 15, and

the slope portions being angled to extend three units longitudinally for each unit of distance that the slope portions extend away from the outer surface of the tank body.

4,697,529

PALLET AND METHOD OF MANUFACTURING THE SAME

Ernst Kero, and Erik Gustafsson, both of Luleå, Sweden, assignors to Plannja AB, Luleå, Sweden

PCT No. PCT/SE84/00050, § 371 Date Oct. 4, 1984, § 102(e) Date Oct. 4, 1984, PCT Pub. No. WO84/03267, PCT Pub. Date Aug. 30, 1984

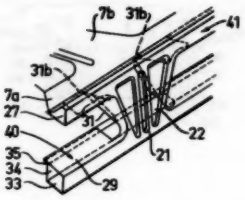
Continuation of Ser. No. 662,408, Oct. 4, 1984, abandoned. This PCT application Feb. 13, 1984, Ser. No. 867,607

Claims priority, application Sweden, Feb. 15, 1983, 8300822; Jan. 19, 1984, 8400252

The portion of the term of this patent subsequent to Apr. 1, 2000, has been disclaimed.

Int. Cl.[4] B65D *19/28*

U.S. Cl. 108—511 10 Claims



1. A pallet made of folded sheet metal comprising a substantially planar and rectangular load-carrying sheet provided with reinforcing grooves and lateral edge pieces folded down from said sheet on all four sides thereof, wherein each edge piece is cut and folded inwardly on itself to form an opening for a pallet lifting means and a box-section reinforcement beam bounding the opening at least on one side of the opening whereby the pallet is accessible from all sides for lifting means inserted beneath the load-carrying sheet.

4,697,530

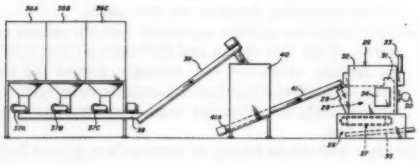
UNDERFED STOKER BOILER FOR BURNING BITUMINOUS COAL AND OTHER SOLID FUEL PARTICLES

Richard P. Marcotte, and John W. Dumont, Jr., both of Monmouth, Me., assignors to Dumont Holding Company, Monmouth, Me.

Filed Dec. 23, 1986, Ser. No. 945,494

Int. Cl.[4] F23B *7/00*

U.S. Cl. 110—234 43 Claims



1. An automatic stoker boiler for space or process heating with steam or hot water, said boiler including a heat transfer compartment having a water inlet and an outlet for steam or hot water, an exhaust, a combustion chamber below said compartment having first and second ends, a transverse partition in said chamber inclined upwardly from the second end and towards but terminating short of the first end to provide a restricted flame and hot gas port and dividing said chamber into upper and lower portions, drive and driven shafts below said chamber, sprockets supported by said shafts, an endless belt of the link type trained about said sprockets and disposed and dimensioned with its upper course forming the grate for the lower portion, means to deliver underfire air upwardly through said upper course, said upper portion having a throat opening adjacent said second end, heat exchanging passageways extending through said compartment and in communication with said throat and said exhaust, means to deliver overfire air into said chamber from said first end above and below said port, means to deliver solid fuel particles to said upper course adjacent said first end, means in said exhaust operable to induce draft in said upper portion and control means operable to effect the advance of said belt by predetermined increments at a wanted rate, means operable to deliver solid fuel to the upper course in predetermined, proportional increments, means to vary the induced draft by predetermined, proportional increments and means to adjust the underfire air volume by predetermined, proportional increments.

4,697,531

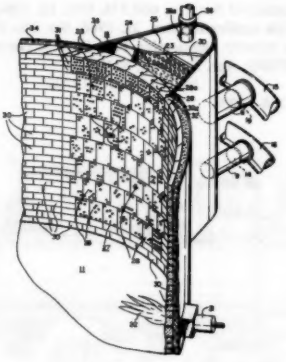
RETAINING WALL WITH HEAT EXCHANGE CHARACTERISTICS FOR THERMAL REGENERATION

Edward H. Benedick, Morristown, N.J., assignor to Regenerative Environmental Equip. Co., Inc., Morris Plains, N.J.

Continuation of Ser. No. 196,590, Oct. 14, 1980, abandoned. This application Jun. 16, 1986, Ser. No. 874,876

Int. Cl.[4] F23M *5/00*

U.S. Cl. 110—336 11 Claims



1. In a heat-exchange apparatus, the combination comprising:

(a) a central high temperature combustion zone,

(b) a vertical wall having a generally closed curve configuration surrounding said zone and made principally of a plurality of refractory, corrosion-resistant blocks, said wall having a first plurality of portions which comprise curved element-holding wall portions in which the blocks are of unitary construction and are disposed in contiguous end-to-end relation in a plurality of rows, with blocks in the rows being in staggard relation to blocks in other rows, to altogether define the curved element-holding wall portion, and in which a substantial plurality of said blocks are perforated therethrough interspersed with a second plurality of portions which are unperforated, said first and second pluralities of portions forming a substantially continuous structures,

(c) a plurality of heat-exchange sections disposed outwardly of said wall but in contiguity therewith, each section being located at a corresponding one of said first plurality of portions in which said blocks are perforated, each section including an outer gas-permeable wall member which cooperates with said one perforated portion disposed inwardly thereof to retain a plurality of heat-exchange elements which exert considerable pressure laterally on said one perforated portion and on said outer wall member, said corresponding perforated portion being con-

structed to have its convex side facing and in contact with said elements and its concave side facing said zone, said perforations being dimensioned to prevent said heat-exchange elements from passing through them under the force of pressurized gas passing through said section, with the perforations in the unitary blocks extending between and connecting opposite said sides of said perforated wall portion between and forming gas conduits between said high temperature combustion zone and a said heat-exchange section, and

(d) means coupled to said section for bringing purified or unpurified effluents to or from said section.

4,697,532

OPERATING METHOD FOR A REFUSE PROCESSING FURNACE

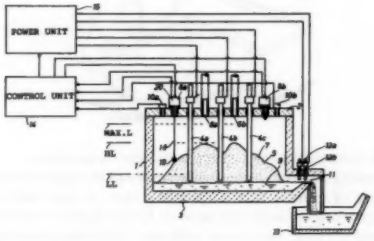
Toshiharu Furukawa; Susumu Shimura, both of Nagoya; Fumio Takai, Seki; Norio Sano, and Tomonobu Ishida, both of Ichinomiya, all of Japan, assignors to Daido Tokushuko Kabushikikaisha, Nagoya, Japan

Filed Aug. 27, 1986, Ser. No. 900,894

Claims priority, application Japan, Aug. 27, 1985, 60-187798; Nov. 11, 1985, 60-254484; Dec. 16, 1985, 60-282604; Apr. 7, 1986, 61-79400

Int. Cl.[4] F23G *5/00*

U.S. Cl. 110—346 **8 Claims**



1. An operating method for a refuse processing furnace which processes refuse by melting with electric power, comprising steps of:

(a) detecting a surface level of a heap of unmolten refuse in the furnace and

(b) controlling amount of both power input and refuse input into the furnace in response to a level value of the heap of unmolten refuse in the furnace detected at the step (a).

4,697,533

DEVICE FOR HOISTING BOATS ON BOARD SHIPS

Jacques Bordreuil, Clamart; Michel Lepage, Neuilly sur Marne, and André Bordat, Rueil Malmaison, all of France, assignors to Constructions Mecaniques de Normandie, France

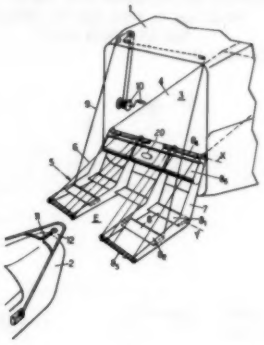
Filed Jul. 17, 1985, Ser. No. 755,792

Claims priority, application France, Jul. 17, 1984, 84 11309

Int. Cl.[4] B63B *35/44*

U.S. Cl. 114—44 **4 Claims**

1. In a device for hoisting a boat on board a ship and for placing this boat in the water from this ship, comprising a ramp coupled to the rear of the ship for pivoting about a horizontal transverse axis related to the ship and for extending longitudinally behind the ship, which ramp is adapted for supporting the boat between the water and the reception zone provided on board the ship, said rramp is formed by a longitudinally extending array of non-extensible cables stretched longitudinally, relative to the ship, over a V shaped cradle, said cradle formed from longitudinal members extending in a widely open V, as viewed in a direction parallel to the said transverse axis, and horizontal cross pieces typing these V shaped members together, the component elements of said cradle likely to be



immersed all having a small cross section so that the drag resistance generated by their immersion is very small.

4,697,534

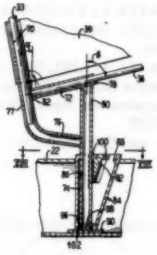
FABRICATED SPAR ADAPTER SAILING RIG

John S. Kettlestrings, 2235 Stonegate La., Wheaton, Ill. 60187

Filed Jul. 17, 1985, Ser. No. 755,788

Int. Cl.[4] B63B *15/00*

U.S. Cl. 114—90 **15 Claims**



1. In a sailing vessel having a hull, a sailing comprising:

a fabricated adapter having,

a downwardly extending leg with a longitudinal axis;

a first arm rigidly connected to said leg by a forwardly extending, rigid extension arm, and being angled upwardly and forwardly at a first acute angle from said axis;

a second arm rigidly connected to said first arm and said leg and being angled rearwardly at a second angle from said axis greater than said first acute angle;

said first and second arm being coplanar with each other and being rigidly interconnected, but extending from opposite sides of said axis;

a rigid but resilient mast span securable to said first arm;

a rigid but resilient boom spar, shorter than said mast spar, securable to said second arm;

an asymmetrical sail having a convex curved lead edge attachable to said mast and a foot attachable to said boom;

at least one receptacle in said hull receiving said downwardly extending leg for rotation about said axis;

said sail having a center of effort downwind of said rotational axis when said sail is set to a proper angle of incidence to the apparent wind;

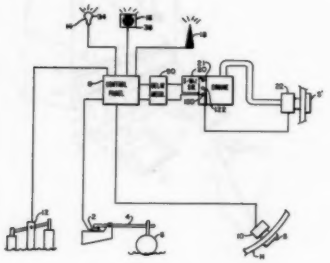
whereby, said sail is easily rotatable about said rotational axis.

4,697,535

MARINE SAFETY SYSTEM

Ben C. Wileman, III, Oklahoma City, Okla., assignor to Wileman Industries, Inc, Oklahoma City, Okla.

Filed Aug. 1, 1986, Ser. No. 891,659
Int. Cl.[4] B63B *13/02*
U.S. Cl. 114—183 R **9 Claims**



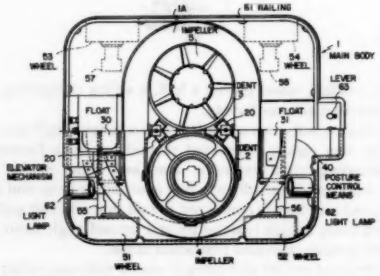
1. A marine safety system comprising a first switch adapted to be activated by rising water in a ship's hull, first solenoid valves adapted to be operated by said first switch and adapted to close a first set of sea cocks in said hull of said ship, and a delay mechanism, the operation of which is initiated by said first switch, said delay mechanism being electrically connected to an engine shut off switch and to a second set of solenoid valves adapted to close a second set of sea cocks associated with an engine of said ship.

4,697,536

UNDERWATER CLEANING APPARATUS

Kiichi Hirata, Yokosuka, Japan, assignor to West Tsusho Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 671,187, Nov. 14, 1984, abandoned. This application Feb. 6, 1987, Ser. No. 11,457
Claims priority, application Japan, Feb. 27, 1984, 59-35638; Feb. 27, 1984, 59-35639
Int. Cl.[4] B63B *59/10*
U.S. Cl. 114—222 **10 Claims**



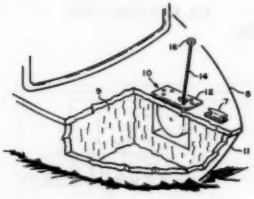
1. An underwater cleaning apparatus comprising a main body, impellers provided substantially at the center of said main body to press the same against the surface of a cleaning object by its rotation, and cleaning brushes provided on said main body at its bottom which are pressed against the object and are concentrical with said impellers to remove substances adherent to the object by rotating, said cleaning apparatus being characterized in that said main body is made movable toward the object surface by the rotation and driving force of the impellers, a pair of each of the impellers and the cleaning brushes are provided in parallel and at the normal angle with respect to the direction in which the apparatus moves forward and backward, the impellers and the cleaning brushes are driven by one driving source by connecting them by means of a universal joint, said pair of impellers are rotated in opposite directions of their associated cleaning brushes, there is provided cylindrical floats having a variable capacity at least in front of and at the back of the impellers so as to control the buoyancy of said main body of the cleaning apparatus underwater, there is provided a circular fixing member which surrounds said impellers and which seals movable substances in its hollow wall so that the movable substances may move in the hollow wall in correspondence with the horizontal movement of the cleaning apparatus, and further there is provided a wheel at each of the four corners of said main body at its bottom and the wheels on one side of the axis in the direction of the forward and backward movement are driven independently of the wheels on the other side of the axis to rotate in opposite directions at variable speeds.

4,697,537

RETRACTABLE LINE STORAGE DEVICE

Thomas C. Smith, 1820 Forney Dr., Huntsville, Ala. 35816

Filed Apr. 28, 1986, Ser. No. 856,770
Int. Cl.[4] B63B *21/04*
U.S. Cl. 114—230 **3 Claims**



1. A retractable line storage container comprising:

a housing having an open upper end and closed lower end, a pair of narrow side walls and a pair of wide side walls connected to said ends so as to form a hollow area within said housing, one of said wide side walls being detachable;

a mounting plate attached to the open upper end of said housing, said plate having a line passage hole therethrough, said mounting plate being larger in all lateral dimensions than the lateral dimensions of the upper end of said housing, said mounting plate having mounting holes therein, each of said mounting holes being located outwardly from said housing;

a reel rotatably mounted within said hollow area;

a line attached at one end to said reel so as to be stored on said reel by rotation of said reel, the other end of said line being a free end and passing through the line passage hole in said mounting plate;

spring means attached between said housing and said reel for rotating said reel and thereby retracting said line into said housing; and

a handgrip attached to the free end of said line, said handgrip being larger than said line passage hole so as to prevent retraction of the free end of said line within said housing; said mounting plate including a thickened portion containing a cup for reception of said handgrip, and finger grip sumps adjacent said cup, whereby said handgrip may be accessed for removal from said cup.

4,697,538

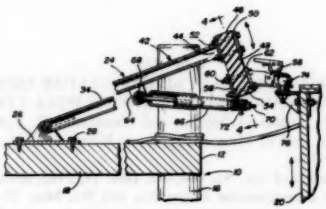
BOAT DOCK MOORING DEVICE

Robert C. Day, Rt. 3, Box 634K, New Iberia, La. 70560

Filed Apr. 15, 1986, Ser. No. 852,218
Int. Cl.[4] B63B *21/00*
U.S. Cl. 114—230 **8 Claims**

1. A boat mooring device including a mount mounted from a dock portion, an elongated generally horizontally disposed

first arm including first and second ends, pivot means pivotally securing said first end to said mount for angular displacement relative thereto about a generally horizontal axis extending transversely of said arm, an elongated second arm including first and second ends, mounting means mounting said second arm first end to said first arm second end with said second arm disposed generally transverse to said first arm and said second arm second end projecting outwardly of one side of said first arm, said second arm including at least a central portion intermediate its opposite ends constructed of shape retentive resilient material, whereby lateral deflection of said second arm



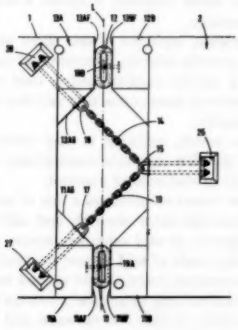
second end from a static position thereof, toward and away from said first end of said first arm and relative angular displacement of said second arm first and second ends may occur and said second arm central portion will yieldingly resist said deflection and angular displacement, anchor means carried by said second end of said second arm for releasable connection with a water vessel mooring fixture, and movement dampening means connected between the second end of said second arm and said first arm intermediate said first and second ends of said first arm for controllably retarding movement of the second end of said second arm toward and away from said first end of said first arm.

4,697,539

ARRANGEMENT FOR INTERCONNECTING CONCRETE PONTOONS

John Creed, Ski, Norway, assignor to Smabathavner a.s, Oslo, Norway

Filed Jun. 24, 1986, Ser. No. 878,083
Claims priority, application Norway, Jun. 24, 1985, 852526
Int. Cl.[4] B63B *35/00*
U.S. Cl. 114—266 **6 Claims**



1. Arrangement for interconnecting pontoons of concrete for small boat harbours, fish raising plants and the like, wherein

at least one side or end of each pontoon has two bumper surfaces at a spacing from each other and adapted to face against and cooperate with corresponding two bumper surfaces on another pontoon,

between respective bumper surfaces on two interconnected pontoons there is mounted a fender which is comppressed with a significant degree of prestressing,

one pontoon has two symmetric and laterally positioned attachment members each for a separate tension element,

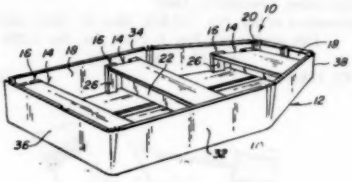
the other pontoon centrally between its bumper surfaces has an attachment member for the common anchoring of the two tension elements, and the anchoring of the tension elements in the attachment members allows a certain degree of articulate or rotary motion.

4,697,540

COLLAPSIBLE FOLDAWAY DINGHY

Douglas A. Graham, 120 B Station Rd., Great Neck, N.Y. 11023

Filed Dec. 6, 1985, Ser. No. 805,619
Int. Cl.[4] B63B *7/00*
U.S. Cl. 114—354 **5 Claims**



1. A collapsible foldaway dinghy which comprises:

(a) a synthetic single skin having a plurality of panels joined by flexible water tight webs which can be folded upwards to form said dinghy and folded downwards to form a small package that will fit in a car trunk and cockpit locker;

(b) a plurality of thwarts, each said thwart having a vertical rib extending downwardly;

(c) means for securing said thwarts across opposite sides of said dinghy, including retaining means so that said thwarts will hold the opposing sidewalls erect in its upwardly folded condition and act as support members and seats for said dinghy, wherein said securing means includes:

(d) a plurality of T-shaped tongues, two of which are formed on each end of each of said thwarts; and

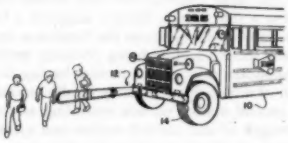
(e) a plurality of vertical support legs each having a T-shaped groove so that said tongues can engage with said said grooves and hold the side walls erect.

4,697,541

CROSSING CONTROL ARM FOR VEHICLES

James H. Wicker, Charlotte, N.C., assignor to Specialty Manufacturing Company, Charlotte, N.C.

Filed Sep. 27, 1982, Ser. No. 423,621
Int. Cl.[4] B60Q *11/00*
U.S. Cl. 116—28 R **8 Claims**



1. A crossing control arm for use on vehicles such as school buses to assist in protecting students walking in front of the vehicle, said crossing control arm comprising:

(a) frame means adapted to be attached to the bumper of a vehicle;

(b) a movable arm comprising,

(i) support means mounted in said frame means by pivot means to permit pivoting of said movable arm between a retracted position adjacent said bumper and an extended position projecting outwardly from said bumper, said support means including a support plate having a substantial extent away from said pivot means;

(ii) rod means including a closed end portion and leg portions extending from said closed end portion, the extending ends of said leg portions being secured to said support plate along said extent thereof;

(c) selectively operable drive means for pivoting said movable arm between said retracted and extended positions thereof.

4,697,542

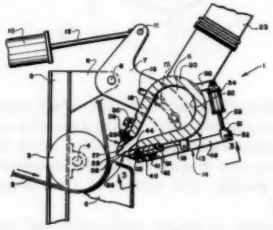
ADJUSTABLE NOZZLE FOR COATING EQUIPMENT

Herbert B. Kohler, Greentown, and John B. Kohler, Canton, both of Ohio, assignors to The Kohler Coating Machinery Corporation, Greentown, Ohio

Continuation of Ser. No. 732,924, May 13, 1985, abandoned. This application Jan. 2, 1987, Ser. No. 4,229

Int. Cl.[4] **B05C** *11/06*

U.S. Cl. 118—63 **22 Claims**



1. Fluid nozzle construction for coating machines and the like including:

a transversely elongated nozzle body having first and second rigid sections movably mounted with respect to each other and movable between a working position and a cleaning position; said first section having a back wall and first and second converging side walls partially forming a fluid pressure chamber for receiving fluid under pressure from a source, said converging sidewalls being in rigidly fixed position relative to each other; said first wall having a first of a pair of nozzle lips, adjustably rigidly mounted on a forward end thereof, for defining a transversely extending nozzle discharge opening with a second of the nozzle lips when the rigid sections are in the working position; the second side wall having a plurality of pivot supports attached thereto adjacent the back wall, said pivot supports being distributed across the transverse length of the nozzle body first section along a common centerline parallel to the nozzle discharge opening, said centerline being spaced from and non-adjacent to said nozzle discharge opening with said second side wall also including a first mating surface adjacent a forward end thereof and extending across the transverse length of said wall; said second section being pivotally mounted on the pivot supports, said second section having the second of the pair of nozzle lips adjustably rigidly mounted thereon, and a second mating surface extending across the transverse length of said second section and located between the nozzle discharge opening and the pivot supports for clamping engagement with the mating surface of the first section; and

pressure means acting on the first and second sections for pivoting the second section about the pivot support for moving said sections between the working and cleaning positions and for clamping the second mating surface against the first mating surface throughout the transverse length thereof for maintaining the nozzle lips in a preset nozzle discharge opening postion by exerting a clamping force in excess of a separating force exerted on the first and second sections of the fluid within the pressure chamber, clamping engagement of the first and second mating surfaces occurring at a location adjacent to the nozzle discharge opening, the clamped mating surfaces being spaced from the common centerline of the pivot supports.

4,697,543

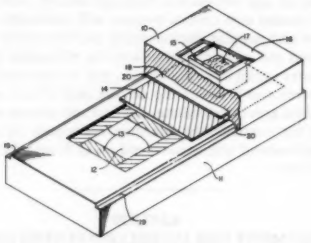
LIQUID PHASE EPITAXY SLIDER/STATOR ASSEMBLY HAVING NON-WETTING GROWTH WELL LINERS

Richard C. Abbott, Arlington, and Honnavalli R. Vydyanath, Sudbury, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 664,493, Dec. 13, 1983, abandoned, which is a continuation of Ser. No. 361,706, Mar. 25, 1982, abandoned. This application Mar. 31, 1986, Ser. No. 846,674

Int. Cl.[4] **B05C** *3/09;* **H01L** *7/38*

U.S. Cl. 118—412 **6 Claims**



1. Apparatus for producing thin film materials, said apparatus comprising:

A. a slider assembly made out of a first material;

B. a stator assembly made out of said first material and having means for guiding movement of said slider assembly on said stator assembly, said slider assembly sliding along said stator assembly between a first position and second position;

C. holding means, included in said slider assembly, for retaining a growth solution, wherein said holding means is made of a second material and is used to prevent said growth material from contacting said first material of said slider assembly;

D. retention means, included in said stator assembly, for holding a thin film substrate material said retention means being made of said second material;

E. protection means mounted on a side of said stator assembly between said stator assembly and said slider assembly and contiguous to said retention means, said protection means being made of said second material; and

F. prevention means made of said second material contiguous with said holding means and mounted on a side of said slider assembly so that it is between said slider assembly and said stator assembly, said protection means, said prevention means, said retention means, and said holding means cooperating to prevent said growth solution from contacting either the first material of said slider assembly or the first material of said stator assembly as said slider assembly slides along said stator assembly between said first position and said second position to prevent contamination of said growth solution by said first material.

4,697,544
DISPOSABLE SPRAY SHIELD

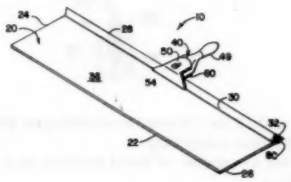
Keith A. Stevens, 4412 E. Mulberry #195; Daniel R. Stevens, 2841 Stanford Rd., and Howard Stevens, Jr., 2731 Stanford Rd., all of Fort Collins, Colo. 80525

Continuation-in-part of Ser. No. 687,831, Dec. 31, 1984, Pat. No. 4,574,731. This application Feb. 4, 1986, Ser. No. 826,081

The portion of the term of this patent subsequent to Mar. 11, 2003, has been disclaimed.

Int. Cl.[4] B05C *21/00*

U.S. Cl. 118—504 **30 Claims**



1. Disposable spray shield apparatus comprising:

a thin, rigid, planar sheet having a top surface and a bottom surface as well as front, rear, and side edges, the rear edge of which has formed thereon thickened rib means for enhancing structural support and resistance to deformation of the planar sheet, and handle means structured for removable attachment to, and engagement with, said rib means for supporting and holding said planar sheet, said thickened rib means being formed with the rear edge portion of said sheet bent out of the plane of the sheet in at least one different plane that is at an angle less than 180° to the plane of said sheet.

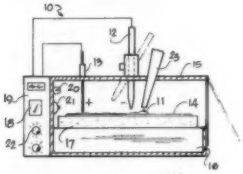
4,697,545
DENDRITE GENERATOR

Morel D. Guyot, 3585 Beverly Glen, Sherman Oaks, Calif. 91423

Filed Dec. 16, 1985, Ser. No. 809,122

Int. Cl.[4] B05B *5/02*

U.S. Cl. 118—624 **9 Claims**



1. A generator for producing non-fibrous decorative dendriform patterns utilizing a flowable liquid comprising:

a substrate having a horizontal working surface: for receiving and supporting said flowable liquid on a localized area of said surface on which said patterns are formed from said liquid;

a support means for holding said substrate with its working surface horizontal means for depositing said flowable liquid on said localized area;

electrical means operable to create a charged force field about substrate supported flowable liquid said electrical means including a power supply operably coupled to a pair of electrodes for establishing said charged force field about said working surface localized area, and said electrical means operable to urge; said liquid to branch and spread from said localized area into said dendriform patterns; and

said substrate being removably carried on said support means so that said working surface is horizontal and supportive of said flowable liquid in its unseparated entirety;

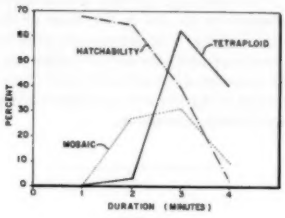
4,697,546
METHOD FOR PRODUCTION OF TETRAPLOID CHANNEL CATFISH

Charles L. Chrisman, West Lafayette, Ind.; Christopher A. Bidwell, Davis, Calif., and George S Libey, Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed May 30, 1986, Ser. No. 868,734

Int. Cl.[4] A01K *61/00*

U.S. Cl. 119—3 **8 Claims**



1. A method for production of tetraploid channel catfish comprising the steps of:

fertilizing an egg from a female channel catfish;

incubating said fertilized egg for a first period of time, said first period of time ranging from the time required for first cell division cleavage of the fertilized egg to a time about ten minutes less than said time required for said first cell division cleavage;

treating said fertilized egg by immersing said egg in water at a temperature of about 40° C. to about 43° C. for a second time period of about one to about four minutes;

incubating the treated fertilized egg for a third period of time, said third period of time being sufficient to allow maturation of said fertilized egg to a tetraploid channel catfish fry.

4,697,547
APPARATUS AND METHOD FOR REARING AND/OR KEEPING ANIMALS

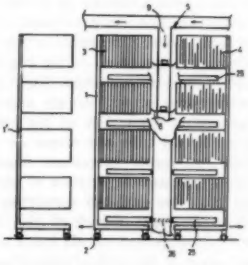
Teus Malestein, 3771 VC Barneveld, Stationsweg 49, Netherlands

Filed Oct. 10, 1985, Ser. No. 786,086

Claims priority, application Netherlands, Oct. 16, 1984, 8403158

Int. Cl.[4] A01K *31/00*

U.S. Cl. 119—18 **14 Claims**



1. An apparatus for rearing and/or keeping animals, said apparatus comprising:

a movable cage assembly comprising a plurality of cages; and

a separate, fixedly mounted service system, adapted to cooperate with a said cage assembly when that cage assembly is moved into a position adjacent thereto, for supplying food and/or drink to the animals in the cages of the cage assembly;

said cage assembly comprising support means, connected to the cages at only the backs thereof, for supporting said cages in vertically spaced relationship one above the other so as to define a narrow space between adjacent vertically spaced cages which is open at the front and the two sides of the cages, and

said service system including a horizontally movable belt, separate from said cage assembly and extending in a direction substantially parallel to the front of the cages, for receiving droppings from animals in a cage located thereabove, and supporting means for supporting said belt in the said space between adjacent ones of said vertically spaced cages so that the belt can receive droppings from a said cage located thereabove.

4,697,548

DEVICE AND METHOD FOR KEEPING ANIMALS

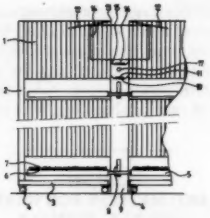
Teus Malestein, Stationsweg 49, 3771 VC Barneveld, Netherlands

Filed Dec. 3, 1985, Ser. No. 803,958

Claims priority, application Netherlands, Dec. 7, 1984, 8403730

Int. Cl.[4] A01K *31/00*

U.S. Cl. 119—22 **11 Claims**



1. Device for keeping animals, comprising:

a unitary cage structure, said unitary cage structure comprising a plurality of cages located in a plurality of superposed horizontally extending rows, each row containing a plurality of cages, each cage being provided with vertical sides and a ceiling, only the cages of the lower most row being provided with a bottom, all of said cages having at at least two of the lower edges of said vertical sides, in a direction along a row, a free space, said free space permitting the passage through all of the cages of a row of a horizontally moveable excrement disposal belt;

a frame independent of said unitary cage structure, said frame comprising a plurality of horizontally moveable excrement disposal belts and means for supporting said horizontally moveable excrement disposal belts, said frame being positionable relative to said unitary cage structure, such that said belt supporting means extends into each of the cages of each of said rows such that a respective belt supported by said frame is positioned near the lower edges of the vertical sides of each of the cages of a respective row of cages of said unitary cage structure, said belt passing through said free spaces of the cages in each respective row.

4,697,549

APPARATUS FOR SUSTAINED DISPENSATION OF A CHEMICAL AGENT

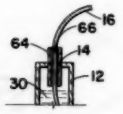
Jakie A. Hair, Route 5, Box 188A, Stillwater, Okla. 74074

Continuation-in-part of Ser. No. 428,641, Sep. 30, 1982, Pat. No. 4,506,630. This application Mar. 12, 1984, Ser. No. 588,578

The portion of the term of this patent subsequent to Mar. 26, 2002, has been disclaimed.

Int. Cl.[4] A61D *7/00*; B67D *3/00*

U.S. Cl. 119—156 **6 Claims**



1. A method for the control of arthropod pests of a warm-blooded animal comprising:

securing a container of liquid pesticide to a warm-blooded animal;

dispensing said pesticide from said container through a synthetic fiber wick extending in part from said container; and

controlling the rate at which said pesticide is dispensed from said container to effect the control of arthropod pests of said warm-blooded animal.

4,697,550

DEVICE FOR COOLING A REACTOR

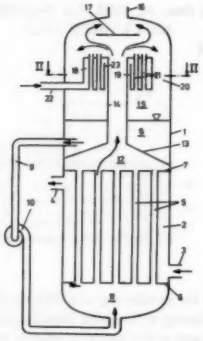
Wolfgang Kehrer, Berlin, Fed. Rep. of Germany, assignor to Borsig GmbH, Berlin, Fed. Rep. of Germany

Filed Nov. 4, 1986, Ser. No. 927,240

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1986, 3605584

Int. Cl.[4] F22B *1/02*

U.S. Cl. 122—34 **3 Claims**



1. An arrangement for cooling a reactor comprising: a reactor; a vessel holding a water chamber and a steam chamber; cooling pipes extending through said reactor and carrying evaporating water; said cooling pipes communicating with said water chamber outside the reactor at the intake end, said cooling pipes communicating with said steam chamber at the outflow end outside the reactor; preheating means positioned inside said steam chamber and communicating with an inflow outside said vessel, said preheating means communicating with an outflow inside said steam chamber; open pipes extending through said preheating means from two sides and into said steam chamber; an ascending pipe positioned along a longitudinal axis of said vessel, said ascending pipe extending through

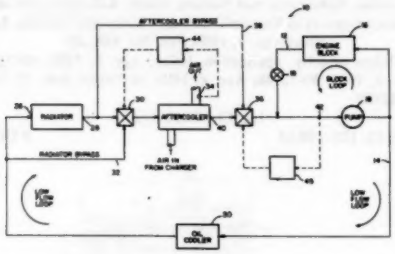
said water chamber and into said steam chamber; said preheating means having a cylindrical shape surrounding said ascending pipe with a gap left between said cylindrical shape and said ascending pipe.

4,697,551

QUICK-RESPONSE CONTROL SYSTEM FOR LOW-FLOW ENGINE COOLANT SYSTEMS

Hals N. Larsen, County of King, and Donald L. Stephens, County of Skagit, both of Wash., assignors to Paccar Inc, Bellevue, Wash.

Filed Jun. 18, 1985, Ser. No. 745,928
Int. Cl.[4] F01P 3/12
U.S. Cl. 123—41.31 3 Claims



1. A quick-response coolant control system for a vehicle engine having a low-flow engine coolant system wherein a major portion of the coolant flows in a high-flow coolant loop containing an engine block and wherein a minor portion of the coolant fluid flows in a connected low-flow coolant loop, serially containing various components, including a radiator and an aftercooler, comprising:

a high-flow coolant loop including an engine block within the high-flow loop;

a low-flow coolant loop connected to the high-flow coolant loop, including a radiator and an aftercooler for cooling engine intake air from a turbocharger;

means for sensing the temperature of air leaving the aftercooler;

a radiator bypass flow conduit to allow coolant fluid in the low-flow coolant loop to bypass the radiator;

a quick-acting, radiator flow control valve in the low-flow loop to mix coolant from the radiator and coolant from the radiator bypass flow conduit to be applied to the aftercooler in response to a signal from the aftercooler temperature-sensing means to maintain the aftercooler at a desired temperature, whereby the compressed air in the after-cooler can be exposed quickly to greatly cooled water from the radiator in the low-flow loop in response to changes in engine load conditions;

an aftercooler bypass flow conduit to allow coolant fluid in the low-flow coolant loop to bypass the aftercooler;

means for sensing the temperature of coolant in the engine block; and

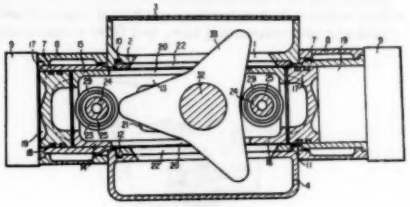
a quick-acting, proportional aftercooler shuttle valve in the low-flow coolant loop to proportionally mix coolant from the aftercooler bypass flow conduit and the aftercooler for application to the low-flow coolant loop in response to a signal from the engine block coolant temperature-sensing means to maintain the temperature of the engine block within a desired range.

4,697,552

MODULAR INTERNAL COMBUSTION ENGINE

Nikola T. Kolev, Varna, Bulgaria, assignor to Naucho Proizvodsvena Laboratoria za Dvigateli s Vatreshno Gorene, Varna, Bulgaria

Filed Nov. 27, 1985, Ser. No. 802,466
Int. Cl.[4] F02B 75/24
U.S. Cl. 123—56 BC 5 Claims



1. A modular internal combustion engine, comprising

a three-cornered cam with shaft, enveloped by two self-adjusting ball joint rolls, disposed at two opposite ends of a double-acting composite piston having

cylinders with an internal surface and having water jackets and cylinder heads, wherein the double-acting piston consists of

a top body and

a bottom body which are interconnected and form a body of the composite piston; said composite piston defining midway oppositely facing vertical slots between the two ends thereof; at the two ends of the body of said composite piston there being

fixed faces, and adjacent the two ends of the piston there are axles with

bushes with an external spherical ball surface sliding thereon; on said bushes with said external ball surface there are arranged

a right concave ball segment and

a left concave ball segment, and on each of the right and left ball segments there is disposed thereabout one of said self-adjusting rolls; the body of said composite piston is placed in

a bearing hole of a top shell and a bottom shell with a joint for motion; the body of the composite piston sliding on a bearing metal surface of said shells and, and only sealing rings rub against the surface of the cylinders, wherein the surface of said shells get lubricated under pressure and said shells press against walls of a surrounding block case having a transverse cylindrical hole therethrough, said block case consisting of

a top cover and

a bottom cover, and said covers are fixed against axial displacement by

a step disposed in

a groove of the block case; said shaft of said three-cornered cam being seated in said transverse cylindrical hole and extending through said vertical slots.

4,697,553

LUBRICATING OIL INPUT SYSTEM

Zong Z. Lie, No.18-1, Kuang Ming Road, West Twen District, Taichung City, Taiwan

Filed Aug. 11, 1986, Ser. No. 895,276
Int. Cl.[4] F02B 33/04
U.S. Cl. 123—73 AD 1 Claim

1. A lubricating oil input system which is connected to an internal combustion engine comprising:

a joiner having a fixing seat to be fixed to the vehicle body;

a first ignition advance vacuum tube connected between said

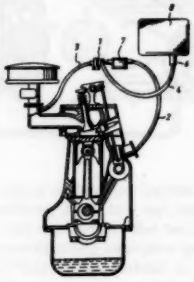
joiner and the distributor of said internal combustion engine;

a second ignition advance vacuum tube connected between said joiner and the carburetor of said internal combustion engine;

a connecting tube connected between said joiner and an oil tank which is used for containing lubricating oil and optionally containing an added cleaner;

a small tube which is disposed in said connecting tube, said joiner, and said second ignition advance vacuum tube;

a filter means which is disposed at the joint region of said oil tank and said connecting tube, said filter means comprising a filter medium to filter the lubricating oil which flows from the oil tank;



a returning means which is disposed on said first ignition advance vacuum tube abutting against the joiner, said returning means comprising a separating plate to separate the returning means into two spaces, the left space having a returning tube connected to said joiner and the right space having an aperture on the right side wall thereof; a one-way valve being fixed proximate to said aperture which protrudes from one end of the returning means housing so as to connect to said first ignition advance vacuum tube.

4,697,554

INTERNAL COMBUSTION ENGINE AND CYLINDER HEAD THEREFOR

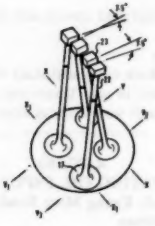
Peter W. Bothwell, "Meoncote" 114 Shipston Road, Stratford upon Avon, Warwickshire, West Midlands, United Kingdom

Continuation of Ser. No. 569,316, Jan. 9, 1984, abandoned. This application Feb. 21, 1986, Ser. No. 833,657

Claims priority, application United Kingdom, Jan. 29, 1983, 8302520

Int. Cl.[4] F01L *1/04*

U.S. Cl. 123—90.22 **8 Claims**



1. An internal combustion reciprocating piston engine comprising a cylinder head defining at least four valve ports which communicate with a combustion chamber defined between the cylinder head and a piston, a plurality of poppet valves, one for each of said valve ports, wherein each of said valves includes a stem defining a respective axis, spring means offset laterally and protruding substantially at right angles away from the axis of each respective valve stem for closing said valves, and an overhead camshaft for operating the valves, wherein the respective paths of said valves, as viewed along an axis defined by the camshaft, converge with each other in a direction away from the combustion chamber, wherein two of the valves have respective heads with centres lying on opposite sides of a plane containing the camshaft axis and a diameter of the piston and wherein the axis of each valve stem substantially intersects the camshaft axis at a right angle and wherein at least adjacent pairs of valves positioned on the same side of said plane containing the camshaft axis also have their respective heads lying in a common plane and wherein said common plane is parallel to said camshaft axis.

4,697,555

VALVE GEAR FOR FOUR-CYCLE ENGINE

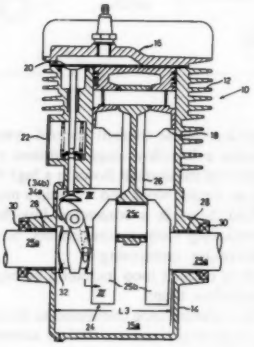
Tetsuzo Fujikawa, Kobe; Makizo Hirata, Kakogawa; Shinichi Tamba, Kakogawa, and Noboru Fukui, Kakogawa, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Apr. 4, 1986, Ser. No. 848,209

Claims priority, application Japan, Apr. 5, 1985, 60-72947; Apr. 5, 1985, 60-72948; Apr. 8, 1985, 60-75169; Feb. 17, 1986, 61-32539

Int. Cl.[4] F01L *1/26*

U.S. Cl. 123—90.23 **9 Claims**



1. A valve gear adapted for a four-cycle engine having a guide portion formed on the outer circumference of an output shaft connected to a crankshaft and of such a shape, folding around said output shaft as to return back to a starting point in two turns, and having interlocking means provided with a portion engaging with said guide portion and moved by the rotation of said crankshaft to open intake and exhaust valves, wherein the improvement resides in that:

said guide portion, only one in number, is provided on said one output shaft; and

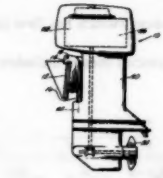
said interlocking means, two in number, respectively driving said intake and exhaust valves, are so disposed basically opposite to each other across said output shaft as to engage with said single guide portion, wherein said guide portion is so formed that the guide position of said interlocking means axially reciprocates once, keeping the same radial distance from the rotation axis of said crankshaft, in two turns thereof; said interlocking means are rotatably supported about a journal intersecting at right angles with said output shaft, and one point on each of said interlocking means is provided with a rocking member engaging with said guide potion; and said rocking member is provided with means to lift said valve by the rocking motion.

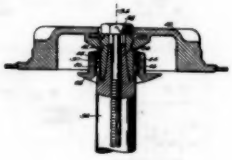
4,697,556

MARINE PROPULSION DEVICE CRANKSHAFT BEARING ARRANGEMENT

Matthew H. Mondek, Wonder Lake, and Louis R. Neal, Zion, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 20, 1985, Ser. No. 799,814
Int. Cl.[4] F02F 7/00
U.S. Cl. 123—195 HC **9 Claims**





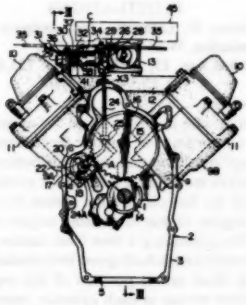
2. A marine propulsion device comprising a lower unit including a rotatably mounted propeller, and an internal combustion engine drivingly connected to said propeller, said engine including an engine block, a crankshaft rotatably supported by said engine block and including an end portion projecting from said engine block, a flywheel including a hub, said hub being mounted on said end portion of said crankshaft and having an outer surface, and bearing means located radially outwardly of said flywheel hub and between said engine block and said outer surface of said flywheel hub for facilitating rotation of said flywheel relative to said engine block.

4,697,557

V-TYPE INTERNAL COMBUSTION ENGINE

Shinichi Tamba, and Noriyuki Ueki, both of Kakogawa, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Jun. 17, 1986, Ser. No. 875,213
Claims priority, application Japan, Jun. 18, 1985, 60-132732; Jun. 18, 1985, 60-132733
Int. Cl.[4] F02D 31/00
U.S. Cl. 123—319 **8 Claims**



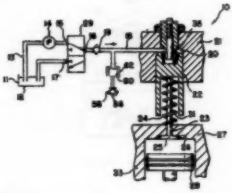
1. A V-type internal combustion engine comprising: a crankcase; a crankshaft having a central axis and supported in said crankcase; governor means for representing a rotational speed of the engine, said governor means being located within said crankcase; cylinders each including a cylinder skirt portion projecting into said crankcase, said cylinders being arranged in a V-shape and having center axes offset from each other in a direction along said crankshaft central axis; and a rotational speed transmission system for transmitting the rotational speed of a governor gear to a governor lever shaft, said rotational speed transmission system engaging a rearward side of the cylinder skirt portion of a cylinder spaced forward from a rearmost cylinder as viewed along the crankshaft central axis.

4,697,558

COMPRESSION RELIEF ENGINE BRAKE

Vincent A. Meneely, 9837 McKinnon, Rural Route No. 10, Langley, British Columbia, Canada (V3A 6X5)

Filed Feb. 18, 1986, Ser. No. 830,378
Int. Cl.[4] F02D 9/06
U.S. Cl. 123—321 **13 Claims**



1. A compression relief brake for four cycle internal-combustion engines, comprising:

a pressurized oil supply;

means for selectively pressurizing a hydraulic circuit with oil from the oil supply;

a master piston and cylinder communicating with a slave piston and cylinder via the hydraulic circuit;

an engine exhaust valve mechanically coupled to the engine and timed to open during the exhaust cycle of the engine said exhaust valve coupled to said slave piston, said exhaust valve being spring-based in a closed state to contact a valve seat;

a sleeve frictionally and slidably disposed within a cavity defined by the slave piston which cavity communicates with the hydraulic circuit, wherein when the hydraulic circuit is selectively pressurized and the engine is operating said sleeve entraps an incompressible volume of oil within said cavity to generate a displacement of the slave piston within the slave cylinder, whereby a first gap is maintained between said exhaust valve and its associated seat; and

means for reciprocally activating the master piston for increasing the pressure within the previously pressurized hydraulic circuit during at least a portion of the expansion cycle of the engine whereby a second gap is reciprocally maintained between said exhaust valve and its associated seat.

4,697,559

METHOD OF CONTROLLING AN AIR-FUEL RATIO FOR AN INTERNAL COMBUSTION ENGINE

Fujiyuki Suzuki, and Akira Onda, both of Hamamatsu, Japan, assignors to Suzuki Jodosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Oct. 11, 1985, Ser. No. 786,910
Claims priority, application Japan, Nov. 30, 1984, 59-253095
Int. Cl.[4] F02M 3/045
U.S. Cl. 123—325 **4 Claims**

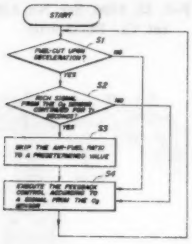
1. In a method of controlling an air-fuel ratio for an internal combustion engine, including the step of feedback-controlling an electronically controlled carburetor using a control section

which receives a signal from an exhaust sensor, the improvement comprising the steps of:

instantaneously and forcibly causing said control section to correct a rich air-fuel ratio so that said ratio becomes lean in order to rapidly return the air-fuel ratio to a proper value when said exhaust sensor outputs a rich signal for a predetermined time period after the air-fuel ratio is increased in richness upon deceleration of the internal combustion engine; and

thereafter resuming said step of feedback-controlling said carburetor.

3. In a method of controlling an air-fuel ratio in an internal combustion engine having an intake passage, an exhaust passage, and an exhaust sensor in said exhaust passage, including the step of monitoring with said exhaust sensor the concentration of a predetermined component of exhaust gases passing



through said exhaust passage, the step of effecting feedback control of an air-fuel ratio within said intake passage in response to the concentration of said predetermined exhaust gas component in said exhaust passage, and the steps of interrupting said feedback control and causing said air fuel ratio to be increased in richness in response to deceleration of said engine, the improvement comprising the steps of: causing said air-fuel ratio to be substantially instantaneously reduced in richness by a predetermined value in response to detection with said exhaust sensor, when said air-fuel ratio has been increased in richness due to deceleration of said engine, of the concentration of said predetermined exhaust gas component being continuously in excess of a predetermined value for a predetermined period of time; and resuming feedback control of said air-fuel ratio following said substantially instantaneous reduction in richness of said air-fuel ratio.

4,697,560

ROTATING SPEED CONTROL APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Kazuhiro Umehara, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Nov. 12, 1985, Ser. No. 797,289

Claims priority, application Japan, Jan. 31, 1985, 60-15541

Int. Cl.[4] F02P *11/02, 11/06*

U.S. Cl. 123—335 **13 Claims**

1. A rotating speed control apparatus for controlling the rotating speed of an internal combustion engine, comprising:

a capacitive discharge ignition circuit;

rotating speed detecting circuit means for monitoring the rotating speed for the engine;

overspeed preventing circuit means cooperable with said capacitive discharge ignition circuit and responsive to said rotatiing speed detecting circuit means for causing said capacitive discharge ignition circuit to limit the rotating speed of the engine when said rotating speed detecting circuit means indicates that the engine is attempting to exceed a first predetermined speed; and

independently manually actuable cut-off circuit means for disabling said overspeed preventing circit means so as to prevent said overspeed preventing circuit means from limiting the rotating speed of the engine;

wherein said cut-off circuit means includes a reset switch and is actuated in response to manual actuation of said reset switch;

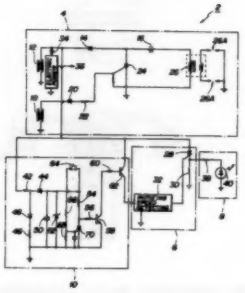
wherein said reset switch is a momentary push button switch;

wherein following manual actuation of said momentary push button switch said cut-off circuit means remains continuously actuated until the engine is stopped, and wherein at a subsequent restart of the engine said cut-off circuit means is deactuated;

wherein said ignition circuit includes a capacitive charging coil;

wherein said push button switch has first and second terminals; and

wherein said cut-off circuit means includes: a thyristor having its cathode connected to ground; a first resistor having a first end connected to the anode of said thyristor and having a second end connected to said first terminal of said push button switch; a second resistor having a first end connected to said second terminal of said push button switch; a third resistor having a first end connected to a second end of said second resistor and having a second end connected to ground; a capacitor having a first end connected to ground and having a second end connected to a gate of said thyristor and to said first end of said third resistor; first means electrically coupling said capacitive charging coil of said ignition circuit to said first terminal of said push button switch; and second means electrically coupling said anode of said thyristor to said overspeed preventing circuit means.



4,697,561

ON-LINE ENGINE TORQUE AND TORQUE FLUCTUATION MEASUREMENT FOR ENGINE CONTROL UTILIZING CRANKSHAFT SPEED FLUCTUATIONS

Stephen J. Citron, W. Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

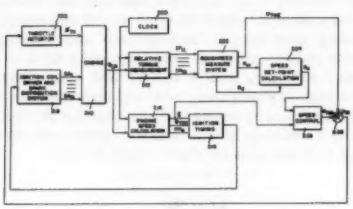
Filed Apr. 15, 1985, Ser. No. 723,449

Int. Cl.[4] F02M *3/07*

U.S. Cl. 123—339 **4 Claims**

1. An adaptive idle control system for an internal combustion engine, comprising an engine fuel distribution system, means for coupling the engine fuel distribution system to the engine's cylinders including a throttle for controlling the flow of fuel through the fuel distribution system for controlling the speed of the engine, means for sensing engine crankshaft position, a clock for generating a time base, means for obtaining a measure of slowest crankshaft speed independent of the occurrence of a top dead center position of the engine crankshaft during the power stroke of each cylinder, means for coupling the clock and the crankshaft position sensor to the means for obtaining a measure of crankshaft speed, means for calculating an index of performance for each of the various cylinders

based upon the measures of slowest crankshaft speeds for the cylinders, means for coupling the performance index calculating means to the clock and the crankshaft position sensor, means for calculating engine roughness based upon the indices of performance, means for coupling the roughness calculating means to the performance index calculating means, means for



comparing the roughness to a roughness set point and adjusting the throttle in response to the comparison to control the idle speed of the engine, means for coupling the comparing and adjusting means to the throttle, means for determining the roughness set point in response to the indices of performance, and means for coupling the roughness set point determining means to the performance index calculating means.

4,697,562

PROCESS AND DEVICE FOR REGULATING THE ROTATION SPEED IN NEUTRAL OF A CONTROLLED IGNITION ENGINE EQUIPPED WITH INTERMITTENTLY FUNCTIONING ACCESSORIES

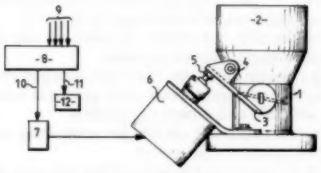
Yves Boccadoro, Feucherolles, and Philippe Shuttler, Antony, both of France, assignors to Regie Nationale des Usines Renault, Boulogne Billancourt, France

Continuation of Ser. No. 583,616, Feb. 27, 1984, abandoned. This application Dec. 4, 1986, Ser. No. 939,287

Claims priority, application France, Feb. 25, 1983, 83 03081

Int. Cl.[4] F02M *3/00*

U.S. Cl. 123—339 **3 Claims**



1. A process for regulating the rotation speed in neutral of an internal combustion engine with controlled ignition during the starting and the stopping of at least one accessory device that causes a sudden variation of the resisting torque, said process comprising the steps of:

(a) testing to see whether the engine is idling;

(b) then, if the engine is idling, testing to see whether there is a request for starting or stopping an accessory device; and

(c) then,

(i) if there is a request for starting the accessory device,

(A) effecting an increase in the air flow to the engine to a value above a reference level for a first predetermined time period (T_1) and

(B) then, after the elapse of the first predetermined time period (T_1), starting the accessory device; and

(ii) if there is a request for stopping the accessory device,

(A) effecting a decrease in the airflow to the engine to a value below the reference level for a second predetermined time period (T_3), and

(B) then, after the elapse of the second predetermined time period (T_3), stopping the accessory device.

4,697,563

METHOD OF CONTROLLING THE OPERATION OF AN AUTOMOTIVE INTERNAL COMBUSTION ENGINE

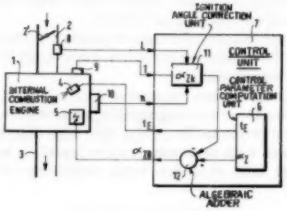
Rüdiger Becker, Murr; Albrecht Clement, Kornwestheim; Gustav Virgilio, Winnenden, and Hugo Weller, Oberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 743,586, Jun. 11, 1985, abandoned. This application Aug. 12, 1986, Ser. No. 896,315

Claims priority, application European Pat. Off., Jul. 12, 1984, 84108179

Int. Cl.[4] F02P *5/14*

U.S. Cl. 123—421 **3 Claims**



1. Method of dynamically and smoothly controlling the ignition angle, particularly under conditions of acceleration, in an automotive internal combustion engine having

means (**6**, **12**) for controlling the instant of ignition of a combustible mixture, with respect to a reference position (TDC) of the engine;

means (**8**) for sensing the engine load and providing a load-representative signal (L); and

means (**11**) for changing the time of the ignition instant by steps with respect to the reference position, upon a change in load, and responsive to said load-representative signal (L), comprising the steps of

sensing an operating parameter, namely load (L), of the engine;

and repetitively selecting a magnitude for each ignition instant change step as a function of the derivative (dL/dt) of said operating parameter and gradually reducing said magnitude at least until a subsequent change step, thereby obviating abrupt changes at low accelerations.

4,697,564

AIR-FUEL RATIO CONTROL SYSTEM

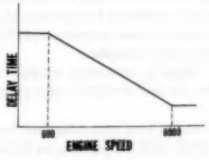
Masaaki Ohgami, Musashino; Hiroki Yasuda, Koganei, and Masaharu Kubota, Musashino, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1985, Ser. No. 710,331

Claims priority, application Japan, Mar. 13, 1984, 59-48773

Int. Cl.[4] F02D *41/14*; F02M *7/14*

U.S. Cl. 123—440 **12 Claims**



1. In an air-fuel ratio control system for a carburetor of an

internal combustion engine having an intake passage, and an exhaust passage from the engine, the control system comprising an O_2-sensor for detecting concentration of a constituent of exhaust gases passing through the exhaust passage, an on-off electromagnetic valve for correcting the air-fuel ratio of air-fuel mixture supplied by the carburetor, an electronic control circuit comprising a comparator for comparing an output signal of the O_2-sensor with a reference value and outputting a correcting signal, an integration circuit operatively connected to the comparator so as to operatively receive said correcting signal and producing an output signal dependent on said correcting signal, and a driving circuit for producing driving pulses for driving the electromagnetic valve in dependency on the output signal of the integration circuit for controlling the air-fuel ratio to a value approximately equal to the stochiometric air-fuel ratio constituting said correcting of the air-fuel ratio, the improvement comprising:

detector means for detecting speed of the internal combustion engine for producing an engine operation signal constituting an engine speed signal;

current control circuit means responsive to the engine speed signal for producing an output current dependent on said speed signal; and

delay circuit means responsive to the output current for delaying the correcting signal operatively received by the integration circuit by a delay time such that the delay time increases with decreasing engine speed, so as to keep the air-fuel ratio at a rich value dependent on the engine speed.

4,697,565

DISTRIBUTOR-TYPE FUEL INJECTION PUMP

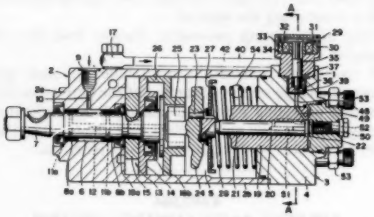
Tadashi Kobayashi, and Shinya Nozaki, both of Higashi-Matsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1985, Ser. No. 813,764

Claims priority, application Japan, Dec. 28, 1984, 59-197537[U]

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—449 **6 Claims**



1. A distributor-type fuel injection pump comprising:

(a) a pump body including a rear portion and a head portion remote from said rear portion, said rear portion having a first bore and said head portion having a second bore extending in alignment with said first bore;

(b) a drive shaft rotatably mounted in said first bore via at least two bearings;

(c) a feed pump disposed in said pump body adjacent to said rear portion and connected in driven relation to said drive shaft, there being defined between said feed pump and said head portion a cam chamber;

(d) a plunger slidably mounted in said second bore and defining between said second bore a pump working chamber;

(e) a cam disposed in said cam chamber and connecting said drive shaft with said plunger so as to cause the latter to take rotational and reciprocating motions simultaneously, in unision with the rotation of said drive shaft;

(f) a magnetic valve disposed on said head portion for opening and closing a fuel passage communicating with said pump working chamber;

(g) a pair of oil seals mounted around said drive shaft and disposed on opposite sides of said feed pump;

(h) said rear portion further having a first passageway communicating with said first bore between said two bearings for introducing a lubrication oil into a space defined between said first bore, said drive shaft and said bearings;

(i) said drive shaft having at least one second oil passageway extending diametrically therethrough and opening at opposite ends to one of said bearings, and a third oil passageway extending axially therein and communicating said second oil passageway with said cam chamber; and

(j) a bypass passage bypassing said cam chamber ans communicating a discharge side of said feed pump with an inlet side of said fuel passage of said magnetic valve.

4,697,566

METHOD OF CONTROLLING ELECTRONIC FUEL INJECTION TO INTERNAL COMBUSTION ENGINE

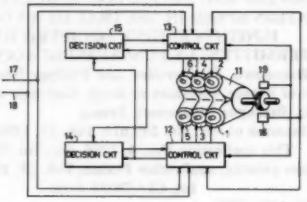
Mikihiko Ohnari, Tokyo; Motohisa Funabashi, Sagamihara; Makoto Shioya, Tokyo; Teruji Sekozawa, Kawasaki, and Masami Shida, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 7, 1986, Ser. No. 927,938

Claims priority, application Japan, Nov. 13, 1985, 60-252723

Int. Cl.[4] F02D *41/22*

U.S. Cl. 123—479 **2 Claims**



1. A method of controlling an electronic fuel injection to an internal combustion engine comprising the steps of:

dividing a plurality of cylinders installed on said internal combustion engine into two groups;

providing a plurality of injectors on each group of cylinders, and dividing said injectors into two groups in correspondence with said two groups of cylinders;

providing two electronic circuits for controlling said two groups of injectors, respectively,

comparing the calculated outputs of fuel injection supplied from said two electronic control circuits, respectively;

judging whether or not the operations of said two electronic circuit are normal on the basis of the result of comparison; and

stopping the fuel injection which is controlled by the electronic circuit which has been judged to be abnormal, while continuing the fuel injection which is controlled by the electronic circuit which has been judged to be normal.

4,697,567

AIR-FUEL RATIO CONTROL SYSTEM OF INTERNAL COMBUSTION ENGINE

Hiroshi Sawada, Gotemba, and Toshimi Murai, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Sep. 5, 1985, Ser. No. 772,888

Claims priority, application Japan, Sep. 6, 1984, 59-187557

Int. Cl.[4] F02D *41/12*

U.S. Cl. 123—489 **17 Claims**

1. An air-fuel ratio control system of an internal combustion

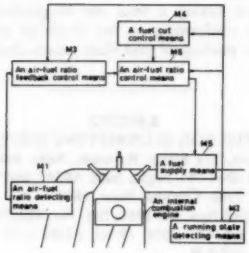
engine which includes means for supplying fuel to the engine, comprising:

(A) air-fuel ratio detecting means for detecting an air-fuel ratio of the internal combustion engine;

(b) running state detecting means for detecting a running state of the internal combustion engine;

(c) air fuel ratio feedback control means for outputting a feedback control signal which will adjust the air-fuel ratio toward an aimed air-fuel ratio corresponding to the detected air-fuel ratio and the detected running state;

(d) fuel cut controlling means for outputting an interruption signal to interrupt a fuel supply to the internal combustion engine when the running state satisfies a prescribed fuel cut condition, and for outputting a reset signal to enable the fuel supply when the running state satisfies a prescribed fuel reset condition; and



(e) air-fuel ratio control means for: (1) outputting a first supply signal to the fuel supply means on the basis of the feedback control signal from the air-fuel ratio feedback control means, (2) interrupting the first fuel supply signal to the fuel supply means when the interruption signal is output from said fuel cut controlling means, (3) determining a prescribed time T_H based on engine parameters, said prescribed time substantially corresponding to an amount of time which is necessary for gas to reach said air fuel ratio determining means after the outputting of said reset signal (4) outputting a second fuel supply signal to the fuel supply means on the basis of an open control of the fuel supply means during said prescribed time T_H from the outputting of the reset signal, and (5) outputting the first fuel supply signal again to the fuel supply means after a lapse of prescribed time T_H.

4,697,568

FUEL INJECTION TIMING CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Akimasa Yasuoka, Tokyo, Japan, assignor to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Feb. 4, 1986, Ser. No. 826,069

Claims priority, application Japan, Feb. 8, 1985, 60-21861

Int. Cl.[4] F02D *41/34*

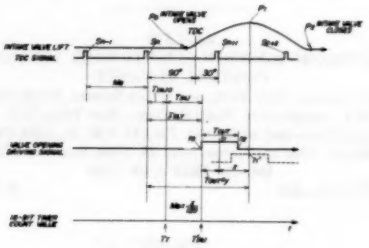
U.S. Cl. 123—490 **6 Claims**

1. A method of controlling the timing of fuel injection in an internal combustion engine having at least one cylinder, wherein a desired fuel injection period is determined based on operation parameters of the engine, and fuel injection is effected into said cylinder for said desired fuel injection period (TOUT) from a predetermined fuel injection beginning time relative to a predetermined crank angle position (Sn) immediately before the suction stroke of the cylinder, the method comprising the steps of:

(a) detecting the value of at least one parameter (Me) representative of the rotational speed of said engine;

(b) obtaining a first time period value by multiplying the detected value of the at least one parameter by a first coefficient (x);

(c) obtaining a second time period value by multiplying the desired fuel injection period by a second coefficient (y), said first and second coefficients being set in accordance with the type of the engine to values that enable fuel to be drawn into said cylinder at a desired timing;



(d) determining elapsed time (TDLY) from said predetermined crank angle position on the basis of the difference between said first and second time period values; and

(e) starting fuel injection from said predetermined fuel injection beginning time (t_0) when the determined elapsed time elapses.

4,697,569

INTAKE SYSTEM FOR A MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

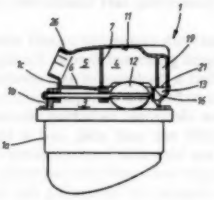
Gernot Hertweck, Fellbach; Fritz Kappis, Sulzbach; Guenter Kellermann, Stuttgart, and Klaus Schalueck, Schwaikheim, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,429

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518505

Int. Cl.[4] F02M *25/06*

U.S. Cl. 123—568 **11 Claims**



1. An intake system for a multi-cylinder internal combustion engine of the type operating with exhaust gas recirculation, comprising:

clean air chamber means for transmitting clean air,

recirculating exhaust gas supply means for transmitting engine exhaust gases,

mixing duct means for accommodating mixing of clean air from the clean air chamber means with recirculated exhaust gases from the exhaust gas supply means,

distributor space means disposed downstream of the mixing duct means and including connection points for suction intake pipes of an internal combustion engine, and

movable air throttle means interposed between the clean air chamber means and the mixing duct means for variably controlling the flow of air from the clean air chamber means to the mixing duct means, and thereby optimize the mix of said clean air to said recirculated exhaust gases in said mixing duct means,

wherein the partition wall means is disposed between the

clean air chamber means and the mixing duct means and distributor space means,

wherein the air throttle valve means is arranged centrally of the mixing duct means in the partition wall means, and

wherein the exhaust gas supply means opens downstream of and concentrically to the throttle valve means.

4,697,570

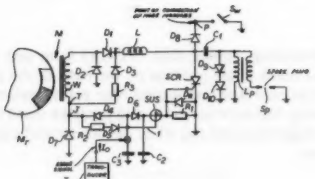
ELECTRONIC IGNITION CIRCUIT WITH AUTOMATIC CONTROL ADVANCE

Dragos Ionescu, New York, and Mihai Soiman, Elmhurst, both of N.Y., assignors to Wedtech Corp., New York, N.Y.

Continuation-in-part of Ser. No. 704,011, Feb. 21, 1985, Pat. No. 4,610,237. This application May 23, 1986, Ser. No. 867,334

Int. Cl.[4] F02P *3/08, 5/04*

U.S. Cl. 123—602 **9 Claims**



1. An electronic ignition system for an internal combustion engine having at least one sparkplug and a magneto having at least one magneto coil having a low voltage winding, comprising:

a charging circuit connected to said winding and providing a rectified output;

a discharge condenser connected to said charging circuit and adapted to be charged by said output;

a triggering circuit including an electronic switch having a control electrode and a high voltage transformer connected by said switch to said condenser and provided with means for connecting said transformer to said sparkplug; and

a nonlinear network connected to said winding and responsive to a signal generated therein for triggering said electrode to effect a discharge of said condenser through said transformer to fire said sparkplug, said nonlinear network including an electronic switching element in circuit with said electrode and said coil, and a logarithmic circuit element in the form of at least one diode in a feedback path between a gate and a principal electrode of said electronic switching element for advancing the firing point of the sparkplug with an increase in speed of the engine based upon changes in the configuration of the charging curve of said capacitor with frequency changes in said winding resulting from engine speed changes.

4,697,571

CROSS BOWS

Shimon Waiser, P.O. Box 360 Midwood Station, Brooklyn, N.Y. 11230

Continuation of Ser. No. 834,552, Feb. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 536,545, Sep. 28, 1983, Pat. No. 4,593,675. This application Apr. 24, 1986, Ser. No. 855,369

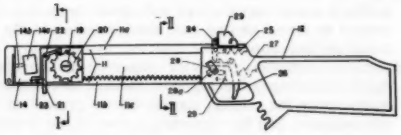
The portion of the term of this patent subsequent to Jun. 10, 2003, has been disclaimed.

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—25 **17 Claims**

1. In a cross bow comprising a stock, a bow, a bow string, a releasable catch for holding said bow string in a cocked position, trigger means operatively associated with said catch for effecting release of said bow string therefrom, the improvement including:

(a) a movable bow slide means to which said bow is attached, said bow slide means being attached to the stock in such a manner that it permits reciprocating motion relative to said stock when the cross bow is being cocked;



(b) slide locking means fixing said slide in different determined positions relative to the stock;

(c) said stock having at least one longitudinally extended guideway conforming to the shape of said bow slide means for guiding of said slide means during its movement.

4,697,572

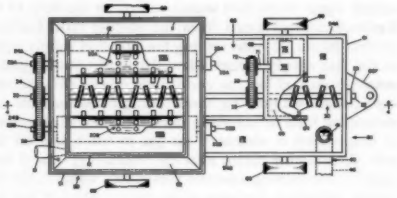
APPARATUS FOR SLURRIFYING SNOW-DEBRIS

Steven P. James, 211 Sicily, Ravenna, Nebr. 68869; Roger W. Karr, R.R. 1 (Box 76), Eagle, Nebr. 68347, and Gary L. Swanson, 324 W. Pine, Ceresco, Nebr. 68017

Filed Nov. 13, 1986, Ser. No. 929,799

Int. Cl.[4] E01C *19/45;* **F24H** *1/00*

U.S. Cl. 126—343.5 R **6 Claims**



1. Apparatus for converting crude snow-debris into a flowable-slurry is flowably dischargeable into a sewerline or other remote discharge site, said apparatus comprising:

(A) a hopper having upright wall means extending upwardly from substantially horizontal flooring and intersected by a longitudinally extending vertical-plane, said upright wall means including a left-wall and a right-wall flanking said vertical-plane and also including a front-wall and a rear-wall intersecting said vertical-plane, said hopper including a horizontally extending annular open-top located a finite overall-height above said flooring, said overall-height including an upper-height portion extending downwardly from the hopper open-top to provide an apparatus upper cascade-zone confined to said hopper, and the remainder of said overall-height including a lower-height portion extending upwardly from said flooring to provide an apparatus lower pool-zone;

(B) inlet-conduit means located within said hopper cascade-zone and adapted for admixing water with crude snow-debris dumped into said hopper annular open-top;

(C) located within said hopper cascade-zone below said inlet-conduit means, a pair of horizontally longitudinally extending and axially revolvable comminution drums flanking said vertical-plane and respective drums having drum-shafts extending through a hopper wall, said comminution drums together being adapted for converting said admixed water and crude snow-debris into a rough-slurry poolable at said pool-zone;

(D) located within said apparatus lower pool-zone, agitator means for agitating said rough-slurry into a flowable-slurry and comprising a horizontally longitudinally extending an axially revolvable agitator-shaft that extends through a hopper wall and that is provided with propulsion blades, and at least a portion of said agitation means being located within said hopper immediately below said comminution drums;

(E) rearward-transmission means connecting said drum-shafts and said agitator-shaft in co-revolvable unison;

(F) apparatus powering means located externally of said hopper and for axially revolving said agitator-shaft; and

(G) outlet means for discharging said flowable-slurry, said oultet means including an intake-end communicating with said apparatus lower pool-zone.

4,697,573

PERCUTANEOUS INTRA-AORTIC BALLOON AND METHOD FOR USING SAME

Peter Schiff, Cookeville, Tenn., assignor to IABP Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 442,958, Nov. 19, 1982, Pat. No. 4,576,142. This application Apr. 15, 1985, Ser. No. 723,087
The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.
Int. Cl.[4] A61B *19/00*
U.S. Cl. 128—1 D **39 Claims**

1. A balloon assembly adapted for facilitating insertion in a vessel comprising:

an elongated catheter tube;

an elongated balloon having a proximal end joined to one end of said catheter tube and having an opposite, distal end terminating in a tip;

a stylet having a distal end terminating in said tip and extending through said balloon and into said catheter tube;

said balloon comprising a sleeve having tapered distal and proximal ends respectively joined to said tip and said catheter tube;

said balloon assuming an annular cross-section when inflated and being generally symmetrical about an imaginary longitudinal axis; and

said tapered distal and proximal ends joining said balloon to said tip and said catheter tube and aligning said stylet so that said stylet is substantially displaced from the longitudinal axis of said balloon to facilitate tight wrapping of the balloon about said stylet;

a luer connector;

a connector control member slidably mounted with said connector;

the proximal end of said stylet terminating in and being secured to said connector;

hollow flexible means coupling the proximal end of said catheter tube to said control member;

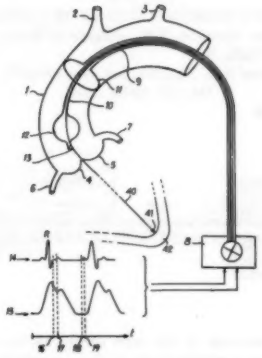
means for moving said control member in a first direction for stretching said balloon preparatory to percutaneous insertion or removal.

4,697,574

PUMP FOR ASSISTANCE IN CIRCULATION

Gilles Karcher, Nancy; Max Amor, Vandoeuvre; Roger Niddam, Le Rancy, and Jean-Pierre Villemot, Nancy, all of France, assignors to Medicorp Research Laboratories Corp., Boca Raton, Fla.

Filed Feb. 20, 1986, Ser. No. 831,349
Claims priority, application France, Feb. 20, 1985, 85 02428
Int. Cl.[4] A61B *19/00*
U.S. Cl. 128—1 D **7 Claims**



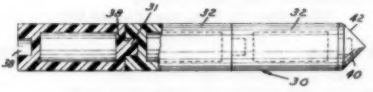
1. Circulatory and coronary assistance pump with intra-aortic balloons, utilizing the signals from an electrocardiogram (ECG) to command the inflation of the balloons during the diastole, comprising: a first sound (9) terminating in a first balloon (11) to plug the aorta (1); a second sound (10) terminating in a second propulsion balloon (12); the said second sound (10) bearing at its one end a sensor (13) of the pressure prevailing in the aorta opposite the cardiac valves, a guide (40) attached to said first and second sounds (9,10), said guide (40) having an end (41) which is fixable in the apex of the left ventricle (42) for insuring the mooring of the sounds (9,10) and the balloons (11,12) for insuring detection of the endo-cavitary potential, and for providing capability of cardiac stimulation; and a pump (8) connected to one and the other ends of said first and second sounds, (9,10), respectively, for insuring, in sequence, the inflation and deflation of the two balloons (11,12) through the sounds (9,10) under the control of an electronic circuit that takes into account both the signals from the ECG and the signals from the pressure sensor.

4,697,575

DELIVERY SYSTEM FOR INTERSTITIAL RADIATION THERAPY INCLUDING SUBSTANTIALLY NON-DEFLECTING ELONGATED MEMBER

Bruce S. Horowitz, Southfield, Mich., assignor to Henry Ford Hospital, Detroit, Mich.

Filed Nov. 21, 1984, Ser. No. 673,859
Int. Cl.[4] A61N *5/01*
U.S. Cl. 128—1.2 **6 Claims**



1. A delivery system for interstitial radiation therapy comprising:

an elongated member made from a material which is absorbable in living tissue, said member having a length substan-

tially greater than its width, and a plurality of radioactive sources predeterminedly dispersed in said member,

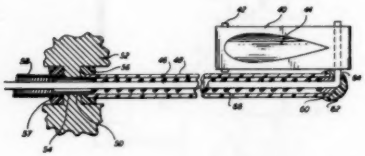
said elongated member having sufficient rigidity to be driven into a tumor without deflection to provide for controlled and precise placement of the radioactive sources in the tumor said elongated member comprising a plurality of separable segments, each segment having first and second complementary ends connectable to respective second and first ends of the adjacent segments.

4,697,576

ENDOSCOPE FORCEPS ELEVATOR CABLE SEAL

Allan I. Krauter, Syracuse, N.Y., assignor to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Feb. 18, 1986, Ser. No. 830,087
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 **11 Claims**



1. In an endoscope of the type employed for endoscopic examination of a patient's body cavity, comprising a flexible tubular member having a flexible outer sheath; a viewing head at the distal end of the tubular member, said head having at least one wall, including imaging means in said head for viewing from said head; a biopsy channel within said tubular member and extending to the distal end thereof and through said head, in which channel an elongated flexible instrument can be inserted to pass through said head into the body cavity; an elevator block rotatably mounted on said head for directing said flexible instrument emerging from said channel generally into the viewing direction of said imaging means, a control cable for said elevator block extending through said flexible tubular member through one said wall of said head and having a distal end connected to said elevator block to pivot the same selectively, an elastomeric sealing sleeve disposed over said cable with a proximal end at said wall and a distal end, and sealing means at the proximal and distal ends of the elastomeric sealing sleeve for hermetically sealing the proximal end of said sleeve with said wall and hermetically sealing the distal end of the sleeve with said cable; the improvement wherein said sealing sleeve is a tubular member of generally cylindrical shape, and further comprising antiabrasion means disposed within said elastomeric sealing sleeve and over said cable for permitting said sleeve to expand and contract axially with travel of said cable, while preventing said sheath from collapsing onto, and contacting said cable, thereby avoiding abrasion of said sleeve from said cable.

4,697,577

SCANNING MICROTELESCOPE FOR SURGICAL APPLICATIONS

John F. Forkner, Laguna Beach, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed May 22, 1986, Ser. No. 866,452
Int. Cl.[4] A61B *1/06*
U.S. Cl. 128—6 **7 Claims**

1. A surgical microtelescope comprising:

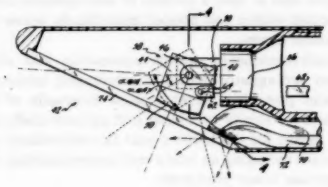
(a) an elongated, sterilizable observation head;

(b) an eyepiece;

(c) elongated optical conduit means connecting said head and eyepiece for transmitting an image from said head to said eyepiece;

(d) said head having mounted therein an objective optical system including a plurality of prisms movable relative to one another; and

(e) actuating means connected to one of said prisms and extending between said head and the eyepiece end of said



conduit means for imparting relative movement to said prisms from said eyepiece end of said conduit means;

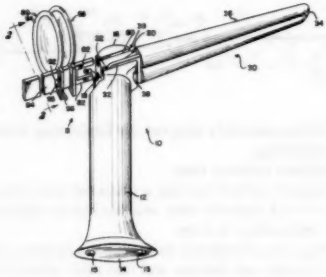
(f) said relative movement of said prisms being such as to vary the angle between the axis of the field of view of said objective optical system and the axis of said head.

4,697,578

ACRYLOOPTIC TONGUE DEPRESSOR AND HANDLE THEREFOR INCORPORATING ADJUSTABLE VIEWING OPTICS

Kermit H. Burgin, R. R. #1, Box 334, Whitestown, Ind. 46075

Continuation of Ser. No. 284,484, Jul. 17, 1981, abandoned. This application Apr. 7, 1983, Ser. No. 482,864
Int. Cl.[4] A61B *1/06*
U.S. Cl. 128—16 **6 Claims**



1. An examination instrument comprising a base unit having a handle portion providing a hand grip and a head portion, the head portion having peripheral surfaces including a first front surface and two side surfaces adjacent the front surface, a first pair of grooves, the grooves of the first pair disposed one on each of the two side surfaces, a second pair of grooves, the grooves of the second pair disposed one on each of the two side surfaces, an examination member having a distal end for contacting a body surface to be examined and a proximal end having a pair of members inserted into respective grooves of the first pair of grooves to removably attach the examination member to the base unit, the examination member having a top surface, a light source mounted in the base unit for providing light in the head portion of the base unit, the examination member being attached adjacent the light source, a viewing lens, and means for removably attaching the viewing lens to the base unit, the attachment means including a pair of members insertable into respective grooves of the second pair of grooves, the viewing lens providing a user with a line of sight above the top surface of the examination member.

4,697,579
APPARATUS FOR ACOUSTIC IRRADIATION OF PATHOLOGICAL CHANGES IN A PATIENT

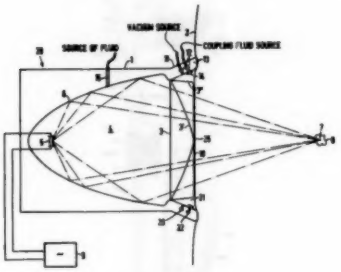
Gerd Wessels, and Arnim Rohwedder, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 28, 1986, Ser. No. 890,116

Claims priority, application Fed. Rep. of Germany, Aug. 19, 1985, 8523751[U]

Int. Cl.[4] A61B *17/22*

U.S. Cl. 128—24 A **3 Claims**



1. In an apparatus for acoustic irradiation of a pathological change in a patient, said apparatus including a housing containing a focusing chamber filled with a fluid and closed by a stretchable membrane and a shock wave generator disposed in said chamber to emit shock waves through the fluid of the chamber, the improvements comprising a ring of elastic material being fastened to the housing of the apparatus to surround the stretchable membrane, said ring projecting beyond the membrane while the membrane is in the idle position, said ring having a channel system of at least two separate channels, one of said channels being connected to a evacuation means and the other of said channels being connected to a supply of coupling fluid so that a space defined by the membrane, ring and a skin of the patient engaged by the ring can be evacuated and filled with a coupling fluid.

4,697,580
BODY MASSAGE APPARATUS WITH DEMOUNTABLE VIBRATOR

Ryugo Terauchi, Tokyo, Japan, assignor to Nippon Rehabili-Medical Corporation, Yokohama, Japan

Filed Oct. 21, 1985, Ser. No. 789,683

Int. Cl.[4] A61H *1/00*

U.S. Cl. 128—36 **17 Claims**

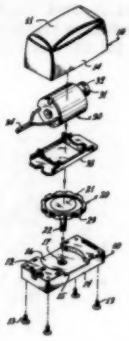
1. A massage apparatus for propagating vibrations to a part of a user's body, comprising: vibrator means for producing vibrations;

means for propagating said vibrations to selected parts of the user's body, said propagating means being releasably secured to said vibrator means;

attachment means at least partially interposed between said vibrator means and said propagating means, for securing it releasably to said vibrator means; and

said attachment means including manually operable means directly accessible to the user for engagement with said propagating means when rotated about its axis in a predetermined direction relative to said propagating means, and for disengagement therefrom when rotated in the opposite direction,

said vibrations propagation means includes a pad member adapted to fit over selected parts of the user's body and said manually operable means includes a generally disc-shape member, and an externally-threaded bar depending



downwardly axially therefrom, for threadably engaging said pad member.

4,697,581
ELECTROMAGNETIC VIBRATION GENERATOR

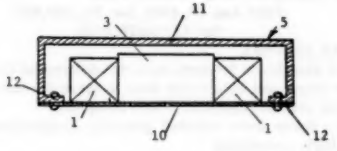
Yoichi Endo, Tokyo, and Kazumi Masaki, Osaka, both of Japan, assignors to Ken Hayashibara, Okayama, Japan

Filed Apr. 1, 1985, Ser. No. 718,431

Claims priority, application Japan, Apr. 4, 1984, 59-67013; Apr. 10, 1984, 59-69929; Aug. 15, 1984, 59-170207

Int. Cl.[4] A61H *23/02*

U.S. Cl. 128—41 **10 Claims**



1. An electromagnetic vibration generator comprising

an elastic plate member;

a solenoid having a magnetic core attached on said elastic plate member;

a rigid casing member mounted over said plate member and made of a magnetic conductive material;

said rigid casing member being supported at least on a pair of opposite edges over said elastic plate member with a surface of said solenoid opposite from a surface facing said elastic plate member uniformly distanced from a wall of said rigid casing member facing said solenoid to form a gap to cause a perpendicular vibratory motion of a frequency in the range of 50 to 80 times a second or 100 to 280 times a second when energized with an alternating current of the same frequency in either range;

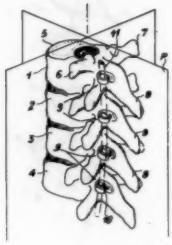
the weight ratio of said solenoid to said rigid casing member being substantially 1 to 9.

4,697,582

APPLIANCE FOR CORRECTING RACHIDIAL DEFORMITIES

Pezé William, 16 rue de Jerrapes, 78800 Houilles, France

Filed Oct. 24, 1984, Ser. No. 664,225
Claims priority, application France, Oct. 28, 1983, 83 17289
Int. Cl.[4] A61F 5/00
U.S. Cl. 128—69 **7 Claims**



1. A biocompatible mechanical assembly for the dynamic correction of rachidial deformities, wherein in the deformed part of the rachis which it is wished to correct is implanted the mechanical assembly comprising, a retaining clamp fixed onto each vertebra of the deformed area, in the angle formed by the spinous process and the lamina, each retaining clamp having at least one guidance opening from one side to the other parallel to the axis of the rachis; and at least one springlike elastic rod in the shape of the corresponding part of a normal rachis, the rod being introduced into the aforementioned guidance openings of the retaining clamps fixed to the vertebrae, the rod being immobilized in rotation in each guidance opening and immobilized in translation on only one of the retaining clamps, said elastic rod applying a force to graually move each vertebra in said deformed area into its normal rachis position.

4,697,583

FOUR-POINT ANTERIOR CRUCIATE LIGAMENT BRACE

Bradley R. Mason, Carlsbad; Jeffrey T. Mason, Escondido, and Patrick W. Cawley, San Diego, all of Calif., assignors to Don Joy Orthopedic, Inc., Carlsbad, Calif.

Filed Jan. 29, 1985, Ser. No. 696,185
Int. Cl.[4] A61F 5/00
U.S. Cl. 128—80 C **25 Claims**

1. A knee brace for applying a net differential force couple to the femur and tibia of the knee to serve the function of an anterior cruciate ligament, which comprises:

(a) a femur lever oriented generally longitudinally of the thigh, comprising

(1) a femur connecting element,

(2) an anterior thigh fulcrum means on an upper portion of said femur lever attached to said femur connecting element for applying a net posteriorly directed force component against the front of the thigh distally of the knee joint, and

(3) posterior thigh-engaging means on a lower portion of said femur lever attached to said femur connecting element for applying a net posteriorly directed force component against the back of the thigh proximal the knee joint,

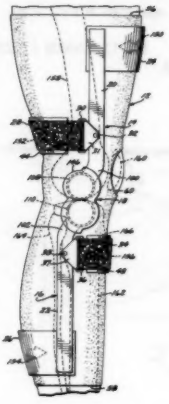
(b) a tibia lever oriented generally longitudinally of the calf, comprising

(1) a tibia connecting element,

(2) a posterior calf fulcrum means on a lower portion of said tibia lever attached to said tibia connecting element for applying a net anteriorly directed force component against the back of the calf distally of the knee joint, and

(3) anterior shin-engaging means on an upper portion of said tibia lever attached to said tibia connecting element for applying a net posteriorly directed force component against the front of the shin proximal the knee joint; and

(c) hinge means hingedly connecting the lower end of said femur lever and the upper end of said tibia lever,



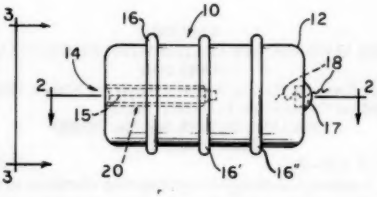
said femur lever and said tibial lever applying, in use, a net differential force couple having an anteriorly directed force component to the femur and a posteriorly directed force component to the tibia proximal the knee joint so as to externally serve the function of the anterior cruciate ligament.

4,697,584

DEVICE AND METHOD FOR PLUGGING AN INTRAMEDULLARY BONE CANAL

Darrel W. Haynes, 3804 Offutt Rd., Randallstown, Md. 21133, assignor to Darrel W. Haynes, Randallstown, Md.

Filed Oct. 12, 1984, Ser. No. 659,975
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 VQ **20 Claims**



11. An inflatable implantable bone plug for plugging an open-ended intramedullary canal of a bone to restrict the flow past said plug of a hardenable bone cement used to fix the stem of an artificial joint prosthesis into the open end of said canal, said plug comprising an expandable container of a biocompatible elastomeric material having an exterior wall configuration which is adapted to be received and implanted within said canal between said stem and the remainder of said intramedullary canal, said outside wall being configured to sealingly conform to the walls of said canal surrounding the container when the container is pressurized to prevent bone cement from passing beyond the plug and entering the remainer of said intramedullary canal, said container having an interior wall enclosing a hollow region, said container having a first end fitted with a resealable valve means to enable injection of a

biocompatible fluid into said interior region through the use of a further cooperating and removable injection means which is sealingly engageable with said valve means and which injection means is removed from said valve means before the insertion of said cement and said stem within the open end of said canal and an opposing second end, said second end being the end which is first inserted into the open end of said canal, said container walls having a sufficient strength and thickness to contain pressure from injection of said fluid, said container further containing a means for the controlled release of said fluid into the remainder of said intramedullary canal to reduce the pressure within said interior region to a minimum a preselected amount of time after injection of a pressurizing amount of said fluid and thereby reduce the pressure against the walls of said intramedullary canal surrounding said plug after said cement has hardened.

4,697,585

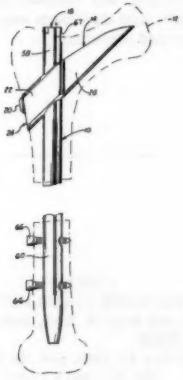
APPLIANCE FOR FIXING FRACTURES OF THE FEMUR

Michael O. Williams, 1708 E. Canary Ct., Edmond, Okla. 73034

Filed Jan. 11, 1985, Ser. No. 690,777

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—92 YZ **12 Claims**



1. An appliance for fixing fractures of the femur, comprising:

a tubular intramedullary nail for implantation in the intramedullary canal of the femur, the intramedullary nail being characterized by an upper end portion in the proximal femur when the appliance is implanted, and a lower end portion positioned in the distal end of the femur when the appliance is implanted, and wherein the intramedullary nail has a longitudinally extending slit formed through the wall thereof along one side of the intramedullary nail;

a cross nail for implantation in the proximal femur, the cross nail having a heel portion at one end thereof and a blade portion extending from the heel portion to the other end of the cross nail for positioning in the head and neck of the femur, wherein an aperture sized to receive the intramedullary nail therethrough is formed through the blade portion of the cross nail at the juncture of said two portions of the cross nail, said aperture extending through the cross nail at an angle to the blade portion substantially equal to the angle between the neck and shaft of the femur, and wherein a threaded bore is formed longitudinally through the heel portion of the cross nail in alignment with the aperture through the blade portion thereof;

a locking screw having a threaded shank for securing the locking screw into said bore and a nose extending from the shank to extend into said aperture in the assembled appliance, wherein said nose has a tapered portion to extend into the slit of the intramedullary nail in the assembled appliance to expand the intramedullary nail into locking engagement with portions of the cross nail extending about said aperture; and

means for securing the lower end portion of the intramedullary nail to the distal end of the femur whereby the femoral shaft is maintained in internal traction.

4,697,586

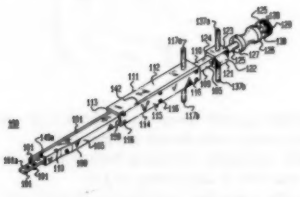
COMBINED CHISEL-GUIDE SURGICAL INSTRUMENT

William J. Gazale, 12423 Henderson Rd., Clifton, Va. 22024

Filed Jun. 24, 1986, Ser. No. 877,778

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—92 V **8 Claims**



1. A surgical instrument for penetrating into at least one bony structure being adjacent to a space which is adjacent to such bony structure, said surgical instrument comprising:

a longitudinally directed guide member including a front end, a rear end, a front lower surface, a front upper surface, and a front guide tip portion having at least one depth limiting projection being located on either of said front upper or front lower surfaces;

a longitudinally directed handle member including a rear end, a first surface, a second surface, and at least one rod member being fixedly connected to either of said handle member first or second surfaces, said handle members being fixedly connected to said guide member;

at least one longitudinally directed chisel member each including a rear end and at least one front cutting edge, said chisel member being longitudinally slidable within said handle member from the rear end to the front end of said handle member, and said chisel member being longitudinally slidable along said guide member front lower surface and front upper surface forward to said guide tip portion such that said chisel member rear end protrudes from said handle member rear end;

a front impact member including a front end, a first surface, a second surface, and a rear surface, said front impact member front end being fixedly connected to said chisel member rear end;

an intermediate longitudinally directed member including a front end, said intermediate member front end being connected to said front impact member rear end; and

an impact hammer member including a front surface and a longitudinally directed central hole, said impact hammer member being accomodated by said intermediate member along said central hole and being longitudinally slidable along said intermediate member;

wherein application of forward force to said handle member including said rod member causes forward penetration of said guide member tip portion into such space up to said limiting projection; and

wherein application of forward motion to said impact hammer member causes said impact hammer member front surface to impact upon said front impact member rear surface thereby causing forward penetration of said chisel member front cutting edge into such bony structure.

4,697,587
DISPOSABLE MOUTH-TO-MOUTH RESUSCITATION DEVICE

Vincent S. Marinkovich, 939 S. Cabrillo Ave., #4, San Pedro, Calif. 90731

Filed Apr. 1, 1986, Ser. No. 846,808
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—203.11 7 Claims

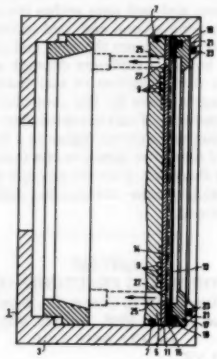
1. A mouth-to-mouth resuscitation device for use by a rescuer with a victim, such device comprising:
- a generally vertically extending hollow body formed at its lower end with a depending socket;
- an upwardly extending mouthpiece formed on said body that terminates at its lower end in a valve seat;
- a vertical air-transfer passage extending through said mouthpiece in alignment with said valve seat;
- a mask on said body below said mouthpiece to cover the mouth of the victim;
- a valve chamber formed in said body socket, said valve seat defining the upper surface of said valve chamber;
- a downwardly opening flapper valve disposed in said valve chamber that is normally biased upwardly into sealing engagement with said valve seat, but which flexes downwardly when the rescuer breathes into said mouthpiece;
- a tongue depressor tube secured to and depending from said socket body for insertion into the mouth of the victim;
- an escape passage extending upwardly through said body from said valve chamber to one side of said body, with the upper end of said escape passage being covered by a finger of the rescuer when the rescuer breaths into said mouthpiece; and
- with breath and vomit expelled from the victim passing through said escape passage, and with said flapper valve restraining breath and vomit of the victim from contacting the mouth of the rescuer.

4,697,588
SHOCK WAVE TUBE FOR THE FRAGMENTATION OF CONCREMENTS

Helmut Reichenberger, Eckental, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 11, 1985, Ser. No. 807,894
Claims priority, application Fed. Rep. of Germany, Dec. 27, 1984, 3447440
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—328 26 Claims

1. A shock wave tube for fragmenting concrements by production of shock waves, comprising:
- a coil;
- a diaphragm located adjacent the coil and producing a shock wave when the coil is energized as a result of electromagnetic interaction therewith;
- a housing mounted to the coil and diaphragm in a manner that a sealed chamber is bounded thereby; and

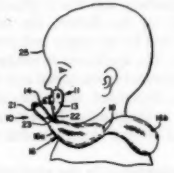


- means for connecting said chamber with a low pressure source, whereby said diaphragm may be drawn towards said coil upon said connection.

4,697,589
INFANT PACIFIER STABILIZING DEVICE

Feather W. King, and John R. King, both of 165 Reiten Dr., Ashland, Oreg. 97520

Filed May 12, 1986, Ser. No. 861,921
Int. Cl.[4] A61J *17/00*
U.S. Cl. 128—359 9 Claims



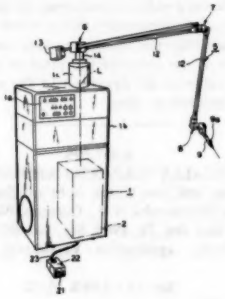
1. In combination with an infant pacifier having a holding ring, an infant pacifier stabilizing device, comprising:
- a bean bag comprising a flexible bag containing bean-like members and having the character of being loose and pliable and easily shapeable into different configurations;
- a flexible appendage secured to and extending from the bean bag in a generally central location, with a fixed end secured to the bean bag and a free end inserted through the ring of the infant pacifier, and including means for fastening the appendage to retain the appendage on the pacifier ring; and
- means for adjusting the configuration of the bean bag and for maintaining it in an adjusted position to accommodate different positions of the infant while generally keeping the pacifier within reach of the infant's mouth.

4,697,590

APPARATUS FOR TREATING ATHLETE'S FOOT

Kimimoto Nakai, and Isao Umezaki, both of Kanazawa, Japan, assignors to Shibuya Kogyo Co., Ltd., Kanazawa, Japan

Filed Dec. 20, 1985, Ser. No. 811,620
Claims priority, application Japan, Dec. 24, 1984, 59-195602[U]; Dec. 28, 1984, 59-199185[U]
Int. Cl.[4] A61N *5/06*
U.S. Cl. 128—396 **8 Claims**



1. Apparatus for carrying out treatment by a laser beam, comprising:

a housing;

a gas laser unit of the TEA type mounted in said housing for emitting a laser beam having a predetermined wavelength;

a multi-joint arm assembly movably mounted on said housing for leading said laser beam emitted from said laser unit to an output end thereof as guided therethrough, said multi-joint arm assembly comprising:

a plurality of arms and a plurality of joints, each of said joints movably connecting ends of corresponding two of said plurality of arms;

a reflecting means for reflecting said laser beam from one of the two corresponding arms to the other;

optical adjusting means for collimating and narrowing the laser beam width disposed in a passage of said laser beam between said laser unit and said output end of said multi-joint arm assembly and for adjusting said laser beam such that it has a predetermined energy density when output through said output end; and wherein

said optical adjusting means includes a pair of input and output optical elements, whereby said input optical element makes the laser beam convergent and said output optical element collimates said convergent laser beam from said optical system.

4,697,591

CARDIAC PACER FOR PACING A HUMAN HEART AND PACING METHOD

Anders Lekholm, and David C. Amundson, both of Bromma, Sweden, assignors to Siemens Aktiengesellschaft, Berlin and Munich

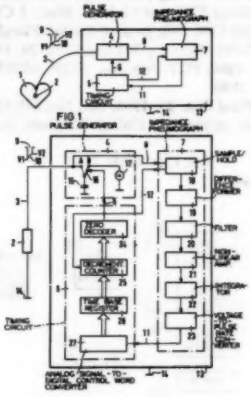
Filed Jun. 16, 1986, Ser. No. 874,591
Int. Cl.[4] A61N *1/36*
U.S. Cl. 128—419 PG **15 Claims**

1. A cardiac pacer for pacing a human heart in a patient comprising

(a) means for generating pacing pulses at a predetermined pacing rate;

(b) means for transmitting the pacing pulses to the human heart for pacing;

(c) means for processing the pacing pulses for obtaining a respiratory signal according to a monitored impedance change in said patient; and



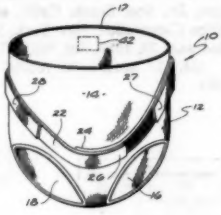
(d) means for varying the predetermined pacing rate dependent on the respiratory signal.

4,697,592

SUPPORT SYSTEM

Irene H. Maddux, and Gordon T. Maddux, both of 1220 Flatau Dr., Prescott, Ariz. 86303

Filed Jan. 14, 1987, Ser. No. 3,100
Int. Cl.[4] A41C *1/08*
U.S. Cl. 450—155 **6 Claims**



1. A support system to provide abdominal and back support to the body of a human being comprising:

a panty like garment having a body portion;

a first resiliently deformable body encircling band member;

a second resiliently deformable band member having a relaxed length substantially less than the relaxed length of said first band member, said first and second band members being permanently secured together at substantially the longitudinal axial midpoint of each;

first fastening means secured to said body of said panty and to said midpoint of said first band member for detachably securing said band members to said panty; and

adjustable fastening means secured to opposite ends of each of said band means for adjustably fastening said band means about the body of a wearer.

4,697,593

METHOD AND APPARATUS FOR MEASURING BLOOD OXYGEN LEVELS

John M. Evans, Bell Cottage, Oaksmere, Appleton, Abingdon, Oxfordshire OX13 5JS, and Colin C. Wise, 2 Clinton Road, Penarth, Cardiff CF6 2JB, both of United Kingdom

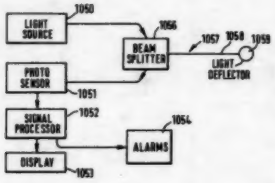
PCT No. PCT/GB85/00281, § 371 Date Feb. 26, 1986, § 102(e) Date Feb. 26, 1986, PCT Pub. No. WO86/00207, PCT Pub. Date Jan. 16, 1986

PCT Filed Jun. 25, 1985, Ser. No. 840,553

Claims priority, application United Kingdom, Jun. 26, 1984, 8416219

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—634 **18 Claims**



1. Apparatus for the in-vivo measurement of blood oxygen levels in a patient, which apparatus comprises,

an elongate probe having a distal end adapted to pass into an internal lumen of the patient selected from the oesophagus and trachea and a proximal end adapted to remain externally of the patient,

means operatively coupled to the probe for illuminating the internal surface of the said internal lumen laterally of the distal end of the probe,

means for viewing in a direction generally lateral of the distal end of the probe so as to observe light reflected from the internal surface of the internal lumen, and

means for determining from the reflected light signal the degree of oxygenation of blood in the internal surface of the internal lumen.

4,697,594

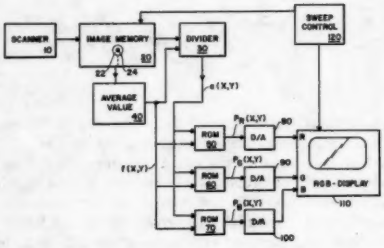
DISPLAYING A SINGLE PARAMETER IMAGE

William T. Mayo, Jr., Seal Beach, Calif., assignor to North American Philips Corporation, New York, N.Y.

Filed Aug. 21, 1985, Ser. No. 767,948

Int. Cl.[4] A61B *6/00, 105/00*

U.S. Cl. 128—653 **22 Claims**



1. A method for displaying an image from an image signal which includes values of a parameter at a large number of image points and which has a wide dynamic range, comprising the steps of:

for each image point:

determining the two-dimensional, local average value of the parameter in a region surrounding the image point to obtain a low spatial frequency, background value at the image point;

dividing the value of the parameter at the image point by said background value to obtain a compressed value of a high spatial frequency component of the image at the image point;

modulating the intensity of a corresponding pixel in a display with the compressed value; and

modulating the hue of the corresponding pixel to a first color when the background value is greater than a predetermined reference value, modulating the hue of said pixel to a second, complementary color when the background value is less than the reference value and modulating the saturation of the color of the pixel in proportion to the absolute value of the deviation of the background value from the reference value.

4,697,595

ULTRASONICALLY MARKED CARDIAC CATHETERS

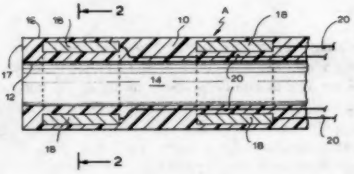
Branko Breyer, and Ivo Cikes, both of Zagreb, Yugoslavia, assignors to Telectronics N.V., Curacao, Netherlands

Filed Jan. 31, 1985, Ser. No. 697,056

Claims priority, application Yugoslavia, Jul. 24, 1984, 1327/84

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—660 **7 Claims**



1. A catheter comprising a substantially cylindrical wall and a hollow lumen, said wall having an inner surface and an outer surface, said wall being made of an ultrasonically transparent and electrically insulating material, said wall including a substantially tubular ultrasonic receiver means disposed therein, said receiver means spaced from said inner surface and said outer surface of said wall, said receiver means including electrical connector means extending longitudinally within said wall, said receiver means including at least a first and second ultrasonic receiver, said receivers being disposed in said wall at longitudinally spaced positions.

4,697,596

TECHNIQUES FOR OBTAINING INFORMATION ASSOCIATED WITH AN INDIVIDUAL'S BLOOD PRESSURE INCLUDING SPECIFICALLY A STAT MODE TECHNIQUE

William T. Link, Berkeley, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Division of Ser. No. 868,313, May 28, 1986, Pat. No. 4,664,126, which is a continuation-in-part of Ser. No. 684,592, Dec. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 622,213, Jun. 19, 1984, abandoned, and Ser. No. 622,080, Jun. 19, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 930,238

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—681 **10 Claims**

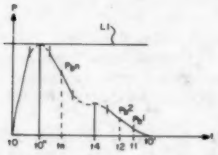
1. A method of providing an arterial curve characteristic of a particular mammal, comprising the steps of:

(a) placing a blood pressure cuff around a particular artery of said mammal;

(b) using means cooperating with said cuff, pressurizing the latter at a number of different pressure levels from zero pressure to a pressure at least equal to the mammal's sys-

tolic pressure and generating cuff pulses having peak to peak amplitude values corresponding to and dependent on said different pressure levels;

(c) determining the diastolic and systolic pressures of said mammal; and



(d) graphically generating said arterial curve in a way which requires the use of said peak to peak values and said diastolic and systolic pressures.

4,697,597

APPARATUS FOR CARDIOGONIOMETRY

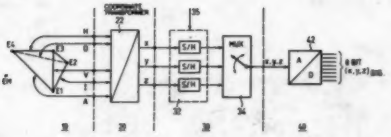
Ernst Sanz, Zaeziwil; Jean P. Steger, Ittigen, and Werner Thie, Wabern, all of Switzerland, assignors to Ernst Sanz, Zaeziwil, Switzerland

Division of Ser. No. 464,765, Feb. 7, 1985, Pat. No. 4,569,357. This application Dec. 4, 1985, Ser. No. 804,454

Claims priority, application Switzerland, Feb. 12, 1982, 898/82

Int. Cl.[4] A61B 5/04

U.S. Cl. 128—699 **27 Claims**



1. An apparatus for processing electrical signals comprising:

a plurality of electrodes for deriving electrical signals from a subject's body,

computing means for processing the signals derived from said electrodes,

means interconnecting each electrode and said computing means,

said computing means being adapted to process signals received from the electrodes positioned in the vicinity of locations defining a predetermined pattern on said body, and

said locations defining apexes of a tetrahedron.

4,697,598

EVOKED POTENTIAL AUTOREFRACTOMETRY SYSTEM

Thomas E. Bernard, Whitehall; Emile M Roth, Pittsburgh; Edwin R. Mohan, Braddock Hills; Gary W. Sherwin, South Huntingdon Township, Westmoreland County, and John M. Zomp, N, Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 25, 1985, Ser. No. 727,032

Int. Cl.[4] A61B 3/10, 5/04

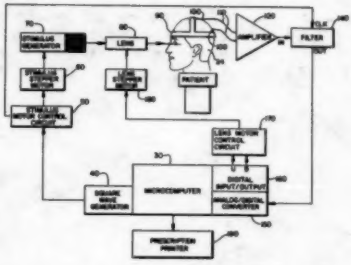
U.S. Cl. 128—731 **41 Claims**

1. An evoked potential autorefractometry system for a patient, comprising:

stimulus production means for producing an alternating steady-state stimulus pattern;

a continuously variable focus lens projecting the stimulus pattern directly to the patient with a continuously changing focus and providing a fixed distance from the pattern to said lens;

evoked potential sensing means for sensing evoked potentials produced by the patient; and



control and determination means for determining the maximum amplitude of the evoked potentials, produced by the patient as the focus of the lens is continuously changed, by narrow band asychronous filtering the evoked potentials and detecting amplitude peaks of the evoked potentials.

4,697,599

APPARATUS FOR LOCATING AND DETECTING PAIN

William Woodley, Unionville, and David Longmire, Hamilton, both of Canada

Continuation of Ser. No. 599,182, Apr. 11, 1984, abandoned. This application Feb. 10, 1986, Ser. No. 827,453

Int. Cl.[4] A61B 5/05

U.S. Cl. 128—734 **20 Claims**

1. A diagnostic device for assessing pain, abnormal sensation or sympathetic dysfunction in a human being or animal comprising:

a housing adapted to be held in a user's hand;

two spaced-apart, concentric electrodes mounted outside said housing for measuring conductance of human or animal tissue over a short distance;

means for rigidly holding and supporting said electrodes in said spaced-apart, concentric relationship;

electric circuit means connected to said electrodes for producing an electrical signal having a pulse frequency that varies directly according to said measured conductance, said circuit means including a voltage to frequency converter having an oscillator with a logarithmic output so that the pulse frequency of said electric signal varies logarithmically according to the conductance measured by said electrodes, said logarithmic output permitting a wide range of tissue conductance to be measured by said device;

a source of low voltage power connected to said circuit means; and

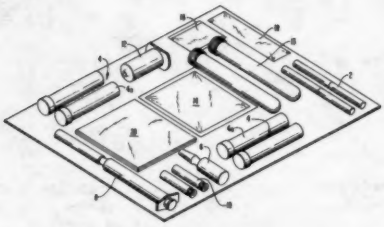
means for detecting said electrical signal to permit the user of said device to determine the pulse frequency of said signal.

4,697,600

METHOD FOR OBTAINING TISSUE AND CELLS BY FINE NEEDLE ASPIRATION FOR CYTOLOGY/BIOPSY AND KIT RELATING TO THE SAME

Frank Cardenas, 6538 Crosswords Dr., Falls Church, Va. 22044, and Ellsworth J. Stay, 1504 Laburnum St., McLean, Va. 22101

Continuation of Ser. No. 547,644, Nov. 1, 1983, abandoned. This application Jun. 4, 1986, Ser. No. 873,051
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—753 36 Claims



1. A method for obtaining tissue and cells for needle aspiration biopsy comprising the steps of:

(a) inserting one end of a fine, hollow needle into an area of body tissue;

(b) inserting the protruding end of said fine, hollow needle into an evacuated container with pre-established vacuum;

(c) continuously suctioning tissue and cell samples through said fine, hollow needle into said container without injection any substance, wherein said tissue and cell samples remain in contact with other cells and tissues which are normally adjacent to said tissue and cell samples until said tissue and cell samples are dislodged by the suctioning force;

(d) withdrawing said fine, hollow needle from said body tissue; and

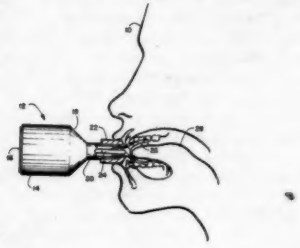
(e) preserving said tissue samples in said container.

4,697,601

TONGUE FORCE MEASURING DEVICE

Darryl L. Durkee, 449 W. Glenoaks Blvd., Glendale, Calif. 91202; Frank E. Manning, 2716 Cumbers Rd., #8, Valley Center, Calif. 92082

Filed Dec. 12, 1986, Ser. No. 940,933
Int. Cl.[4] A61B *5/10*
U.S. Cl. 128—777 14 Claims



1. A device for measuring tongue forces in three dimensions which comprises:

a substantially closed housing having an opening in one wall;

an elongated beam extending into said housing through said opening and having a fixed end secured within said housing;

a diaphragm within said housing adjacent to said fixed beam end;

an axial bore through the length of said beam;

a pin means extending through said bore for axial movement therein;

means for preventing relative rotation between said pin and beam;

said pin having one end adapted to contact said diaphragm and a free end extending beyond said beam;

strain gage means on said beam for sensing beam bending;

strain gage means on said diaphragm for sensing diaphragm deflection;

tongue cup means fastened to said pin free end;

said tongue cup having a hollow adapted to receive patients's tongue; and

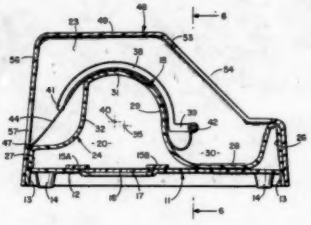
means for converting variations in strain in said strain gages caused by movement of a tongue against said tongue cup into proportional voltages.

4,697,602

MOTOR DRIVEN BULK MATERIAL ROLL AND WRAPPING MACHINE

Terry L. Pelkey, 1104 24th Ave., NE., Minneapolis, Minn. 55418

Filed Mar. 28, 1986, Ser. No. 845,620
Int. Cl.[4] A24C *5/08, 5/10;* A24D *3/02*
U.S. Cl. 131—51 20 Claims



1. A machine for rolling and wrapping bulk material with a sheet member comprising:

a base,

support means mounted on the base, said support means having side wall and an upward convex curved wall joined to said side walls, each of said side walls having an upwardly curved convex slot and a generally linear forward slot extended away from said convex curved support means, said curved slot having a rear and located adjacent the rear portion of the curved support means, roller bar means extends transversely of the convex curved wall, said bar means having opposite ends extended through said slots, a flexible apron draped over said convex curved support means, said apron having a first end attached to said bar means and a second end fixed with respect to said support means, and drive means for rotating said roller bar and moving the roller bar along said slots whereby bulk material placed on said apron adjacent said roller bar is rolled into a generally cylindrical shape within a sheet member carried by the apron and discharged as a cylindrical product from the apron when the roller bar means is moved to the rear of the slots.

4,697,603
APPARATUS FOR BUILDING A STREAM OF FIBROUS MATERIAL

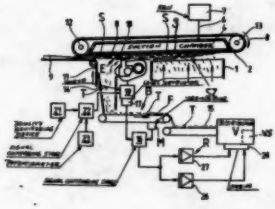
Jürgen Steinhauer, Glinde, and Wolfgang Steiniger, Börnsen, both of Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Mar. 19, 1986, Ser. No. 841,447

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509814

Int. Cl.⁴ A24C *5/14*

U.S. Cl. 131—84.4 **8 Claims**



1. Apparatus for forming a stream of fibrous material, such as tobacco, comprising a source of fibrous material; means defining a stream building zone; adjustable means for feeding fibrous material from said source to said zone wherein the material accumulates into a continuous stream containing a surplus of material; adjustable means for removing the surplus from the stream, said removing means being movable with reference to said zone; a signal generating device for monitoring the position of said removing means relative to said zone; means for returning the removed surplus to said source; signal generating means for monitoring the quantity of the removed surplus, including a weighing device for fibrous material; signal comparing means for generating signals denoting the difference between the signals from said monitoring means and said monitoring device; and means for adjusting said feeding means in response to signals from said signal comparing means.

4,697,604
EXPANSION OF TOBACCO

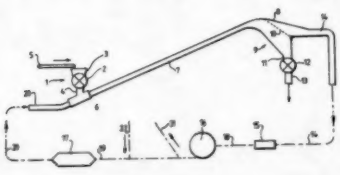
Ian C. Brown, Winchester; Roger W. Hedge, Lymington, and David J. Molyneux, Southampton, all of England, assignors to British-American Tobacco Company Limited, London, England

Filed Jun. 13, 1986, Ser. No. 874,020

Claims priority, application United Kingdom, Jun. 15, 1985, 8515217

Int. Cl.⁴ A24B *3/18*

U.S. Cl. 131—296 **5 Claims**



1. A method of expanding tobacco, which comprises;

establishing a flow of hot gaseous medium in a transport duct;

feeding particulate tobacco treated with an expansion agent into said duct; and

separating said tobacco from said medium in a separator downstream of the duct; whereby the exposure time of said tobacco to said medium is less than one second; said separator comprising a casing, a gaseous-medium tobacco inlet to the casing, a gaseous-medium outlet from the casing which outlet is disposed generally opposite the gaseous-medium inlet, a gas pervious separation screen extending across the interior of the casing such that the gaseous-medium inlet and gaseous-medium outlet are at opposite sides of the screen, and a tobacco outlet at the same side of the screen as is the gaseous-medium inlet.

4,697,605
CONTACT LENS CLEANING APPARATUS

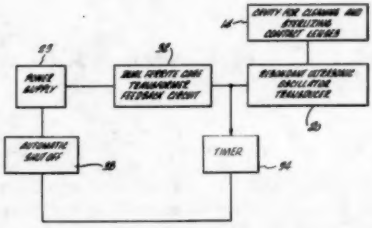
Simon K. C. Yung, Jardines Lookout, Hong Kong, assignor to SMC Metal Tech Co., Ltd., Hong Kong

Continuation-in-part of Ser. No. 676,004, Nov. 29, 1984, Pat. No. 4,607,652. This application Jun. 2, 1986, Ser. No. 869,417

Claims priority, application European Pat. Off., Aug. 6, 1985, 85304482

Int. Cl.⁴ B08B *3/12*

U.S. Cl. 134—107 **7 Claims**



1. A contact lens cleaning and disinfecting apparatus, comprising at least one cavity for containing at least one contact lens together with an aqueous non-chemosterilant liquid, at least one ultrasonic transducer for applying ultrasonic vibrations to the liquid and lenses contained in the cavity, oscillating means for driving the ultrasonic transducer including a transformer feedback circuit using one or more cores of high magnetic permeability and low core loss to stabilize the resonant frequency of the ultrasonic transducer means, and a timer for controlling the energizing of the oscillator means for a predetermined period of time.

4,697,606
CRANKED PATIO UMBRELLA FEATURING CRANKED TILT

Mark J. S. Ma, 12th Fl., 578 Kwang Fu S. Road, Taipei, Taiwan

Filed Nov. 1, 1985, Ser. No. 794,522

Int. Cl.⁴ A45B *17/00*

U.S. Cl. 135—20 M **7 Claims**

1. In an umbrella having a generally vertical fixed lower support post with an upper and a lower end, an upper support post with an upper and a lower end which is pivotally attached to the upper end of said lower support post, a foldable umbrella cover carried by the upper end of said upper post, and a runner adapted to be driven upward along said lower post and over the juncture of said two posts onto said upper post for expanding said cover, improved means devoid of a pull cord for drivingly raising said runner and also for tilting said upper post relative to said lower post, said improved means comprising, in combination:

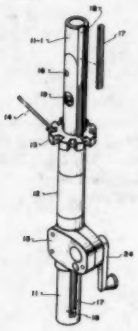
a first gear rack extending from said juncture downward along said lower post and secured thereto;

a second gear rack extending from said juncture upward along said upper post and secured thereto, said two gear racks being substantially contiguous when said upper post is in vertical alignment with said lower post;

gear wheel means carried by said runner and cooperating with said gear racks for driving said runner upward;

gear means carried by the lower support post proximate said

juncture and adapted to drivingly tilt said upper post relative to said lower post and to selectively retain said upper post in said tilted position; and



a removable operating handle adapted to be selectively used to drive either said gear wheel means or said gear means.

4,697,607

PROCEDURE AND MEANS FOR MAKING THE EFFECT OF GRAVITY THE SAME IN FLOW REGULATORS INDEPENDENT OF THE INSTALLATION MODE

Erkki Aalto, and Veikko Ylä-Hemmilä, both of Kausala, Finland, assignors to Halton Oy, Finland

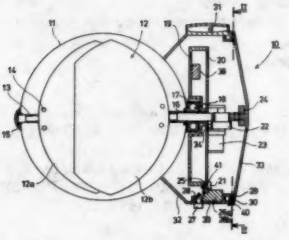
PCT No. PCT/FI84/00037, § 371 Date Jan. 7, 1985, § 102(e) Date Jan. 7, 1985, PCT Pub. No. WO84/04803, PCT Pub. Date Dec. 6, 1984

PCT Filed May 17, 1984, Ser. No. 694,519

Claims priority, application Finland, May 20, 1983, 831801

Int. Cl.[4] F17D *1/04;* F15D *1/02*

U.S. Cl. 137—1 **18 Claims**



1. A method for rendering equal the effect of gravity independent of the mode of installation in flow regulators for gaseous substances, particularly for air in air-conditioning and ventilation installations, and for maintaining the volumetric flow rate of the gaseous substance at desired magnitude with sufficient accuracy when differential pressure acting across the flow regulator varies within given limits, said flow regulator comprising an envelope and a regulating member turnably disposed in a flow passage confined by the envelope, said regulating member turning with increasing differential pressure progressively crosswise with reference to the direction of flow, a torque produced by the gaseous substance on the flow regulating member and a countertorque dependent on the position of the regulating member causing the regulating member turning in the flow passage to assume an equilibrium position such that the requisite pressure drop for maintaining the volumetric flow at pre-selected magnitude is achieved, comprising the steps of

first balancing the regulating member without the countertorque dependent on the position of the regulating member, and

thereafter resetting a weight producing the countertorque by its mass, by rotating said weight around a turning axis of the regulating member as much, but in the opposite direction, as the current mode of installation deviates from a separately defined basic installation.

4,697,608

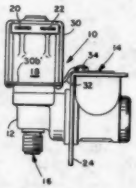
ELECTROMAGNETIC VALVE ASSEMBLY

Lawrence A. Kolze, Bensenville; James M. Pick, and Wesley S. Swanson, both of Elk Grove, all of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 30, 1986, Ser. No. 858,426

Int. Cl.[4] F16K *31/06, 27/10*

U.S. Cl. 137—1 **17 Claims**



14. A method of manufacturing a solenoid operated valve comprising the steps of:

(a) providing a non-metallic valve body with an opening valving cavity and inlet passage communicating therewith;

(b) assembling valve seat, armature and armature guides in said cavity opening and sealing thereabout by non-metallic weldment;

(c) securing an electrical coil and pole frame over said guide;

(d) providing an annular insert having a precision volume cavity and assembling a resilient flow control washer therein to form a sub-assembly;

(e) flow testing said flow washer in said sub-assembly; and,

(f) installing said sub-assembly in said inlet passage and sealing said inlet by non-metallic weldment.

4,697,609

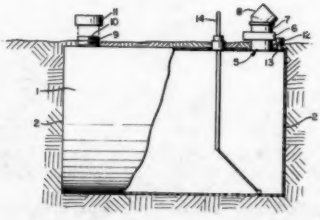
HOLDING TANK FOR WASTE FLUIDS AND PROCESS FOR DISPOSING OF WASTE FLUIDS FROM RECREATIONAL VEHICLES

Helmut Salewski, HC 1, Box 134, Olive Bridge, N.Y. 12461

Continuation of Ser. No. 689,858, Jan. 9, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 903,875

Int. Cl.[4] F03F *5/00*

U.S. Cl. 137—1 **3 Claims**



1. A process of disposing of sewage and grey water from a recreational vehicle at a campsite comprising the steps of:

(a) locating underground and proximate to a parking location for a recreational vehicle a holding tank made of a

material substantially impervious to chemical breakdown when placed in contact with sewage and grey water;

(b) discharging sewage and grey water into the holding tank, said discharging step comprising the steps of:

(i) connecting an inlet on the holding tank to a discharge post on the recreational vehicle so that the holding tank is in sealed communication with the recreational vehicle;

(ii) opening a control valve on the inlet to permit the discharge of the sewage and grey water from the recreational vehicle into the holding tank; and

(iii) closing the control valve to seal the holding tank; and

(c) removing the sewage and grey water from the holding tank at a time subsequent to their storage in the holding tank.

4,697,610

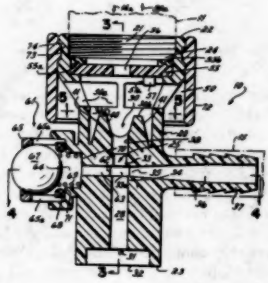
FAUCET PROPORTIONER

James C. Bricker, Waynesville, and David H. Lippman, Cincinnati, both of Ohio, assignors to Hydro Systems Company, Cincinnati, Ohio

Filed Oct. 16, 1986, Ser. No. 919,782

Int. Cl.[4] F17D *1/00*; F16K *24/00*; E03C *1/046*

U.S. Cl. 137—3 **24 Claims**



19. A method for mixing two separate fluids in a proportioner and comprising the steps of:

defining a first stream from a first fluid and directing said first stream into the mouth of a venturi means having a port connected to a second fluid for drawing said second fluid into said first fluid stream;

defining at least one second stream from said first fluid and directing said second stream of said first fluid adjacent but outwardly of and spaced from said mouth and along an exterior wall of said venturi means; and

entraining within said second stream fluid dispersing from said first stream proximate said venturi mouth and adjacent said second stream, said second fluid stream combining with said first fluid stream, and said second fluid therein, downstream of said venturi means.

4,697,611

DEVICE AND METHOD FOR RESTRICTING GAS FLOW

Virgil L. Winland, Westerville, and James J. Matyskella, Columbus, both of Ohio, assignors to Worthington Cylinder Corporation, Columbus, Ohio

Filed Mar. 19, 1986, Ser. No. 841,434

Int. Cl.[4] F16K *47/08*; F15D *1/02*; B65D *83/14*

U.S. Cl. 137—14 **4 Claims**

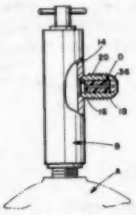
1. A method for restricting outlet fluid flow in a passage comprising the steps of:

providing a pressure vessel adapted with a valve regulating fluid flow, said pressure vessel having an inlet/outlet member including a passage of predetermined dimension communicating therewith;

filling said pressure vessel with fluid through said passage at a first flow rate;

supplying an elongated restrictor adapted for close receipt in said inlet/outlet member passage, said restrictor including an opening having a dimension substantially less than said passage predetermined dimension for limiting fluid flow therethrough;

placing said restrictor into engagement with said inlet/outlet member passage in the absence of fluid flow therethrough;



deforming one end of said inlet/outlet member passage to retain said restrictor in said passage, said deforming step including cross-staking one end of said inlet/outlet member; and,

releasing fluid from said pressure vessel through said passage and said restrictor opening at a second flow rate, said second flow rate being substantially less than said first flow rate.

4,697,612

VALVE ARRANGEMENT FOR THE VENTILATION AND THE VENTING OF FUEL TANKS FOR MOTOR VEHICLES

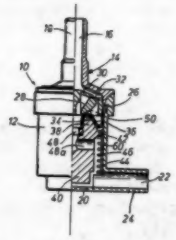
Wolfgang Kleineberg, Wendlingen, and Dieter Scheurenbrand, Wolfschlugen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 29, 1986, Ser. No. 901,874

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531159

Int. Cl.[4] F16K *17/36*

U.S. Cl. 137—39 **9 Claims**



1. A valve arrangement for ventilating and venting fuel tanks for motor vehicles, comprising housing means having a connecting channel for connecting to said tank and a ventilation and venting channel, vacuum valve means opening in case of a vacuum in the tank, excess pressure valve means opening in each of an excess pressure in the tank and safety valve means located underneath the excess pressure valve means in the installed housing position, all of said valve means being provided in said housing means, said safety valve means including a displaceable mass member by means of which a valve closure member is movable under the influence of gravity into its closing position beginning with a predetermined inclined position of the housing means, the weight force of the mass mem-

ber acting on the valve closure member increasing in the course of a continuing housing displacement, and for purposes of closing the safety valve means, the mass member thereof being movably arranged in the housing means rectilinearly in the direction of the valve closure member and in the direction towards the connecting channel to close said safety valve against pressure in said tank.

4,697,613

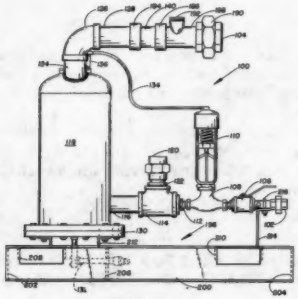
PRESSURE COMPENSATED FLOW RATE CONTROLLERS

Dennis A. Wienck, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Division of Ser. No. 808,786, Dec. 13, 1985, abandoned. This application Jan. 6, 1987, Ser. No. 798

Int. Cl.[4] F16T *1/12*

U.S. Cl. 137—171 **4 Claims**



1. Apparatus for regulating the fluid pressure of fluent material from a fluid source, comprising:

an input conduit connected to receive fluent material from said fluid source at high pressure and high volume;

pressure regulator means connected to said input conduit and providing output of said fluent material at a pressure reduced to a preselected amount;

separation means for removal of contaminants from said pressure regulator means output for providing a substantially contaminant-free output of said fluent material;

flow rate controller means receiving said reduced pressure substantially contaminant-free output and providing a constant flow rate output of fluent material at selected low pressure and constant volume and including,

a tubular frame having an inlet end and an outlet end and defining a flow chamber of equi-centric volume having a cross-sectional area that tapers from a maximum area at the inlet end proceeding to a minimum area throat portion and back approaching the maximum area at the outlet end;

flow restrictor means movably supported axially through said chamber and defining a transverse cross-sectional area of selected diameter at an axial position adjacent said inlet end; and

spring means urging said flow restrictor means toward said inlet end at a predetermined force that maintains a selected flow rate of fluent material proportional to the fluid pressure differential across said flow restrictor means and;

a support frame of rugged, planar construction adapted to receive each of said input conduit, pressure regulator means, separation means and flow rate controller means in secure mount thereon so that said support frame is movable as an equipment package.

4,697,614

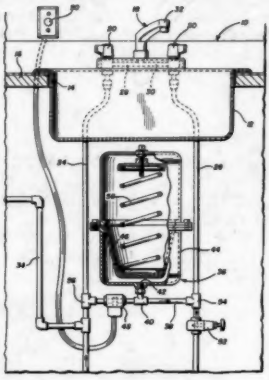
WATER CONSERVATION SYSTEM

Debora L. Powers; John G. Powers, both of P.O. Box 95, Melbourne, Fla. 32902, and Eugene L. Rogina, 2235 Pueblo Dr., Billings, Mont. 59102

Filed Sep. 10, 1985, Ser. No. 774,365

Int. Cl.[4] F16K *49/00*

U.S. Cl. 137—337 **6 Claims**



1. A water conservation system for use in a water useage location in which valved hot and cold water outlets are located and wherein the outlet ends of hot and cold water supply lines of substantially the same pressure are operatively connected to said outlets, said system including a by-pass line with respective ends communicating said hot and cold water supply lines upstream from but reasonably adjacent said outlets, a remotely operable flow-control valve serially connected in said by-pass line with water accumulator means, said water accumulator means communicated with the interior of said by-pass line on the side of said control valve adjacent said cold water line, and a pressure regulator connected in said cold water line upstream from the point of communication of said by-pass line with said cold water line and operative to limit the pressure in said cold water line downstream from said pressure regulator to a pressure at least somewhat below the first mentioned pressure.

4,697,615

BUTTERFLY VALVE FOR CONTROLLING HIGH-TEMPERATURE FLUID

Yoshihiro Tsuchimoto, Musashino, and Kazuhiko Takesa, Yokosuka, both of Japan, assignors to Asahi Glass Company Ltd. and Nippon Kokan Kabushiki Kaisha, both of Tokyo, Japan

Filed May 1, 1985, Ser. No. 729,230

Int. Cl.[4] F16K *27/00*

U.S. Cl. 137—340 **10 Claims**

1. A butterfly valve for controlling high temperature fluid comprising:

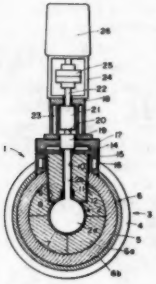
a casing having a fluid passage defined therein, said casing having at least one refractory inner layer;

a valve formed of ceramics and rotatably arranged in said fluid passage, said valve including a valve disc and a valve stem which are unitarily formed;

a valve guide opening extending from the outside of said casing and through said inner layer to said fluid passage, said valve guide opening having means for permitting said valve to be received through said inner layer and into said fluid passage; and

a plug for inserting said valve stem, said plug being arranged to sealingly close said valve guide opening in said inner layer and rotatably support said valve stem, said plug and

said inner layer cooperating to define stop means for limiting movement of said plug into said inner layer,



whereby said plug and said valve are together insertable and removable as a single uint.

4,697,616

FLUID FLOW CONTROL APPARATUS

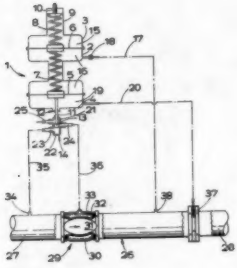
Andrew J. Ashcroft, Gloucester, England, assignor to National Research Development Corporation, England

Filed Apr. 30, 1986, Ser. No. 858,220

Claims priority, application United Kingdom, May 2, 1985, 8511146

Int. Cl.[4] G05D *16/00*

U.S. Cl. 137—486 **20 Claims**



1. Fluid flow control apparatus, for controlling the flow of fluid through a pipe, comprising a fluid flow governor; in the pipe, a fluid flow control valve the extent of the opening of which is solely determined by the governor and producing, in operation, a control pressure at a predetermined location in the pipe downstream of the valve; and means for producing, in operation, a differential pressure derived from a characteristic of fluid flow in the pipe, the fluid flow governor having a first pressure-responsive element to which the differential pressure is applied, spring means always connected to the first pressure-responsive element so as to act thereon in opposition to the differential pressure, a second pressure-responsive element to which the control pressure is applied, means for loading the second pressure-responsive element in opposition to the control pressure and means for combining displacements of the two pressure-responsive elements to control the setting of the fluid flow control valve.

4,697,617

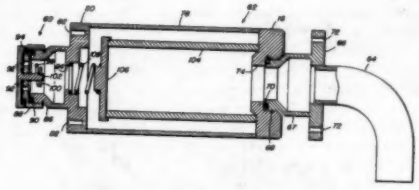
PRESSURE RELIEF FILTER AND VALVE AND CRYOPUMP UTILIZING THE SAME

Edward L. Bourke, Boxboro, and James E. Cartwright, Bellingham, both of Mass., assignors to Helix Technology Corporation, Waltham, Mass.

Filed Jan. 22, 1985, Ser. No. 693,128

Int. Cl.[4] B01D *8/00, 39/08*

U.S. Cl. 137—549 **3 Claims**



1. A pressure relief valve assembly comprising:

a filter housing having an inlet at one end thereof surrounded by a filter seat and an outlet opposite to the inlet at the other end thereof;

a relief valve housing in communication with the filter housing outlet, the valve housing having an outlet opposite to the filter housing outlet such that the filter housing inlet and outlet and the valve housing outlet form an in-line fluid path;

a valve closure, spring and O-ring for closing the valve housing with the O-ring pressed between the closure and the valve housing, the spring being positioned within the valve housing for pulling the closure against the O-ring;

an extended, cup-shaped filter within the filter housing, the filter having an open end adjacent to the filter housing inlet and a closed end opposite to the filter housing inlet; and

a filter spring coaxial with the filter housing outlet for pressing against the closed end of the filter to press the filter against the seat surrounding the filter housing inlet.

4,697,618

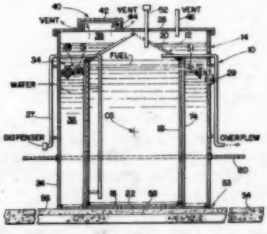
CONTAINER STRUCTURE FOR DANGEROUS MATERIAL

Stanley A. Youtt, Avon Lake, and John W. Dixon, Newbury, both of Ohio, assignors to The American Tank & Fabricating Co., Cleveland, Ohio

Filed Jan. 7, 1985, Ser. No. 689,294

Int. Cl.[4] B65D *25/18, 90/34;* **F16K** *24/02;* **F17C** *3/02*

U.S. Cl. 137—587 **13 Claims**



1. Apparatus comprising a support surface and a container structure for a dangerous material slidably disposed on said support surface, said container structure comprising an inner container defining a chamber for receiving the dangerous material, an outer container surrounding the inner container, a fluid chamber disposed between said inner and outer contain-

ers, means defining a vent space disposed between said inner and outer containers in the area above said fluid chamber, wall means separating and sealing said fluid chamber from said vent space, a normally static body of non-flammable liquid completely filling said fluid chamber and being substantially confined in said fluid chamber, the outer container having a bottom wall adapted to slidably engage said support surface so that the container structure can slide on the support surface in response to an external impact overcoming its inertia, the fluid chamber surrounding said inner container and extending from the bottom wall of the outer container to the wall means separating and sealing the fluid chamber from the vent space so that the normally static body of liquid in said fluid chamber applies pressure completely around the inner container over a height that corresponds to the height of the fluid chamber, thereby distributing the force of an impact over the inner container, and enabling the container structure to slide as a solid body on the support surface in response to an external impact which overcomes its inertia, normally closed venting means associated with said wall means and responsive to the temperature of said non-flammable liquid for opening communication between said fluid chamber and said vent space when the temperature of the non-flammable liquid reaches a predetermined level.

4,697,619

SOLENOID VALVE HAVING A POWER AMPLIFIER

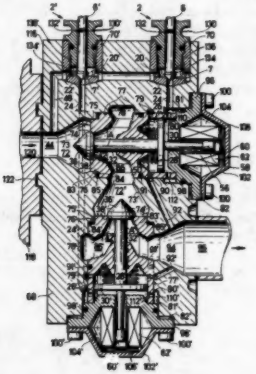
Edelbert Tiefenthaler, Elgg, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Continuation of Ser. No. 482,989, Apr. 7, 1983, abandoned. This application Feb. 14, 1986, Ser. No. 830,512

Claims priority, application Switzerland, Apr. 7, 1982, 2147/82

Int. Cl.[4] F16K *31/02*

U.S. Cl. 137—613 **4 Claims**



1. A valve comprising

a casing block having an inlet for a flow of medium and an outlet for a discharge of medium;

a pair of solenoid valves mounted in said casing in parallel relative to the flow of medium to said inlet, each said solenoid valve including a valve seat, a pilot valve body seated on said seat and an electromagnet for moving said valve body relative to said seat;

a first power amplifier connected to a first of said solenoid valves, said power amplifier having a space for receiving a flow of medium from said inlet, a main valve body sealing said inlet from said space, a calibrated leak piston connected to said main valve body, a first chamber on a side of said piston remote from said main valve body in communication with said valve seat of said first solenoid valve and a second chamber on a side of said piston near said main valve body in communication with said first chamber through said calibrated leak piston and with said outlet; and

a second power amplifier connected to a second of said solenoid valves, said second power amplifier being connected in series with said first power amplifier and having a second space for receiving a flow of medium from said space of said first power amplifier, a second main valve body sealing said second space from the first space, a second calibrated leak piston connected to said second main valve body, a first chamber on a side of said second piston remote from said second main valve body in communication with said valve seat of said second piston near said second main valve body in communication with said first chamber of said second power amplifier through said second calibrated leak piston and with said outlet.

4,697,620

SANITARY VALVE ASSEMBLY

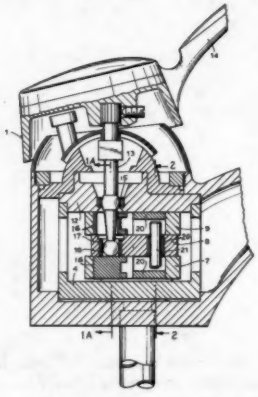
Konrad Bergmann, Wittlich, Fed. Rep. of Germany, assignor to American Standard Inc., New York, N.Y.

Filed Jul. 14, 1986, Ser. No. 884,937

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3525053

Int. Cl.[4] F16K *11/078, 39/04*

U.S. Cl. 137—625.17 **7 Claims**



1. A sanitary valve assembly comprising; a housing and at least two control elements, said at least two control elements positioned in parallel coplanar relation and operably mounted therein, one of which is in the form of a stationary valve seat and is adapted to be coupled to a water supply source, said control elements shaped at least partly annular and formed having relatively narrow sealing surfaces; the other of said two control elements is movably and displaceably mounted on said stationary valve seat and including a control handle operably coupled thereto, said handle operated control element being in face-to-face, sealing contact with said stationary valve seat so that when said valve assembly is in its opened position, said handle operated control element is shifted linearly partially out of sealing engagement therewith.

4,697,621
METHOD AND DEVICE FOR FILLING A FLUID FRICTION CLUTCH

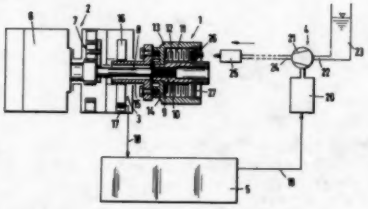
Eberhard Diessner, and Ulrich Zahn, both of Wolfsburg, Fed. Rep. of Germany, assignors to Volkswagen Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

Filed May 8, 1986, Ser. No. 861,092

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1985, 3520585

Int. Cl.[4] **B65B** *3/26;* **F16D** *35/00*

U.S. Cl. 141—1 **9 Claims**



1. A method of filling a fluid friction clutch having a drive side and a driven side, and sets of clutch plates in a housing which is closed off from the outside and partially filled to a relatively high degree with a viscous liquid medium, the method comprising the steps of: generating a drive torque on the drive side of the clutch; measuring torque transmitted by the clutch to the driven side; comparing the torque measured with a preassigned torque target value; and delivering a quantity of viscous liquid medium to the housing during said measuring step as a function of the comparison between the torque measured and the preassigned torque target value so that the housing is filled to a point where the clutch produces the preassigned torque target value at the driven side.

6. A device for filling a fluid friction clutch having a housing, a drive side and a driven side, comprising: drive means connectable to the drive side of the fluid friction clutch; torque measuring means connectable to the driven side of the fluid friction clutch; filling means connectable to the housing of the fluid friction clutch for delivering a viscous liquid medium; and control means having an input side connectable to the torque measuring means and an output side connectable to the filling means for signalling the filling means to fill the housing of the fluid friction clutch with an amount of the viscous liquid medium yielding a preassigned target torque value depending on the actual transmitted torque values delivered by the torque measuring means said control means being provided so as to deliver the viscous liquid medium to the clutch while receiving the torque values delivered by the torque measuring means.

4,697,622
PASSIVE FILLING DEVICE

William Swift, Fountain Valley, Calif., and Robert E. Fischell, Silver Spring, Md., assignors to Parker Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 616,339, Jun. 1, 1984, abandoned. This application Jun. 13, 1986, Ser. No. 874,790

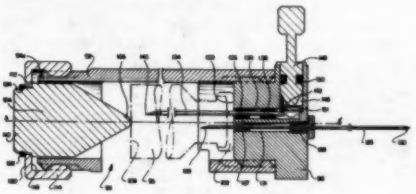
Int. Cl.[4] **B65B** *1/04;* **A61B** *19/00*

U.S. Cl. 141—1 **2 Claims**

1. A method for filling a medication infusion apparatus comprising the steps of:

inserting a commercial style medication vial containing deaerated medication into a housing containing a hollow needle and a hollow vent needle, causing one end of said fill needle and said vent needle to be inserted through a septum closing one end of said vial and causing said fill needle and vent needle to be in fluid communication with said deaerated medication;

inserting the other end of said fill needle through a self-sealing system located on said medication infusion apparatus and into a fluid chamber maintained at a pressure lower than atmospheric pressure; and



allowing air at atmospheric pressure to enter into said vial through said vent needle, until the appropriate amount of the deaerated medication has been drawn into said fluid chamber from said vial.

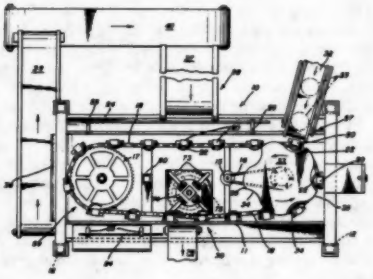
4,697,623
APPARATUS FOR CONTINUOUSLY FILLING AND PREPARING POTS FOR RECEIVING PLANTS

Floyd E. Bouldin; Lloyd Bouldin; Dwight Bouldin, and Jerry W. Pack, all of McMinnville, Tenn., assignors to Bouldin & Lawson, Inc., McMinnville, Tenn.

Filed Aug. 21, 1986, Ser. No. 899,068

Int. Cl.[4] **A01G** *5/04;* **B65B** *1/00*

U.S. Cl. 141—80 **19 Claims**



1. Apparatus for continuously filling and preparing pots for receiving plants, comprising:

(a) an endless conveyor,

(b) pot receiving means on said endless conveyor for carrying said pots,

(c) conveyor drive means for continuously moving said conveyor, to move said pot receiving means in an endless path,

(d) a loading station in said path in which a plant pot is deposited in said pot receiving means,

(e) a pot filling station adjacent said path downstream of said loading station and in which potting soil is received in a pot carried by said pot receiving means,

(f) a pot drilling station in said path downstream of said loading station,

(g) pot drilling means in said drilling station comprising a rotary turret and a plurality of rotary drills mounted on said turret, said turret having a vertical axis,

(h) means mounting said turret for rotary movement about said vertical axis,

(i) means mounting said drills for rotary and vertical axial movement on said turret means at uniform radial distances from said turret axis,

(j) drill drive means for rotating said drills,

(k) turret drive means for rotating said turret in synchronism with said conveyor drive means, so that a pot moving in said path through said drilling station is in continuous vertical alignment with one of said drills, and

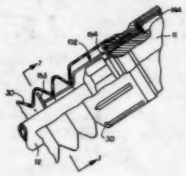
(l) means vertically moving said drills as they revolve about said turret axis between a raised position in which said drill is spaced above a corresponding aligned pot and a lower position in which said drill penetrates the potting soil within said vertically aligned pot to drill a hole therein.

4,697,624

VAPOR RECOVERY NOZZLE

Allen M. Bower, Erie; Eric J. Butterfield, Fairview, both of Pa., and Robert D. Roberts, Jefferson, Ohio, assignors to Emco Wheaton, Inc., Conneaut, Ohio

Filed Jan. 27, 1986, Ser. No. 823,005
Int. Cl.[4] B67C *3/34*; B65B *31/06*
U.S. Cl. 141—208 **17 Claims**



1. In a valved nozzle for controlling the flow of fluid from a hose to a tank having a fill tube, the nozzle having a main body adapted for connection to the hose, a fluid discharge tube projecting outwardly from the main body for insertion into the fill tube, a fluid passage defined by the main body and located therein for the flow of fluid from the hose to the discharge tube, a trigger located below the main body, a trigger-operated valve mechanism for controlling the flow of fluid through the fluid passage, a shroud assembly surrounding the discharge tube for containing a flow of vapor from the tank when the fluid discharge tube is inserted in the fill tube, and a tripping mechanism located in the main body and connected to the valve mechanism whereby the valve mechanism in inoperative when the tripping mechanism is actuated, the improvement comprising:

a vapor passage defined by the main body and located therein above the fluid passage for the flow of vapor from the shroud assembly to the hose;

sensing means connected to the shroud assembly for sensing displacement of a portion of the shroud assembly with respect to the fluid discharge tube; and

actuating means connecting the tripping mechanism to the sensing means for actuating the tripping mechanism when a portion of the shroud assembly is displaced.

4,697,625

STUMP TRIMMER

John D'Arcy Bolton, 5 Shiloh Cir., Irvine, Calif. 92714

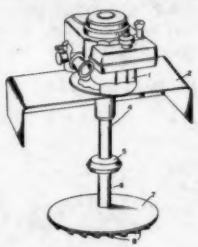
Filed May 5, 1986, Ser. No. 859,912
Int. Cl.[4] A01G *23/06*
U.S. Cl. 144—2 N **1 Claim**

1. An apparatus for severing tree stumps below ground level comprising in combination:

a power lawn mower, including a canopy, a motor, mounted on said canopy, a rotatable drive shaft directly driven by said motor, a blade mounting plate fixedly attached to an end of said drive shaft, and

a cutter means including a shaft, means detachably mounting an end of said shaft to said blade mounting plate of said power lawn mower, a circular disk fixedly mounted to another end of said shaft, said disk having a plurality of cutting teeth attached to the periphery of said circular disk,

whereby rotation of said drive shaft driven by said motor



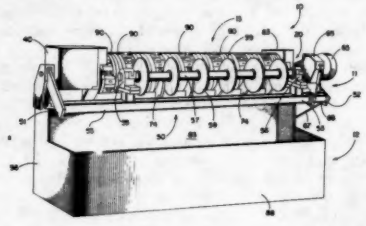
causes said disk to rotate so that when said lawn mower is placed over a hole adjacent a tree stump and propelled toward the stump said teeth on said disk severs the stump below ground level.

4,697,626

LOG CHIPPING AND FLAKING APPARATUS AND METHOD

Stanley D. Arasmith, 5146 Big Texas Valley Rd., Rome, Ga. 30164

Filed Oct. 14, 1986, Ser. No. 917,999
Int. Cl.[4] B27L *11/00*
U.S. Cl. 144—373 **15 Claims**



6. An apparatus for making flakes from a log comprising:

a flaking head including a flaking cylinder, said cylinder comprising a plurality of discs and including a plurality of axially overlapping knives arrayed along the periphery of said discs and extending outwardly from said disc periphery;

means for rotating said discs about their longitudinal axes, and

means for guiding said flaking cylinder toward said log at a controlled speed.

14. A method of producing flakes from a wooden member comprising the steps of:

holding a wooden member in a position under a flaking head, said flaking head including a rotating wood flaking cylinder, said cylinder comprised of a plurality of discs and including a plurality of axially overlapping knives arrayed along the periphery of said discs and extending outwardly from said disc periphery; and

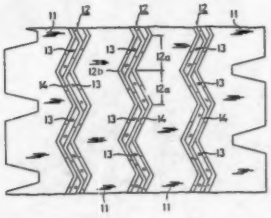
guiding said flaking head toward said log at a controlled speed so that said periphery of said disc does not touch said log.

4,697,627

PNEUMATIC TIRE TREAD

Katsuharu Mitsutake, Itami, Japan, assignor to Toyo Tire & Rubber Company Limited, Osaka, Japan

Filed Jan. 23, 1986, Ser. No. 821,788
Claims priority, application Japan, Feb. 7, 1985, 60-22665
Int. Cl.[4] B60C *11/06*
U.S. Cl. 152—209 R 3 Claims



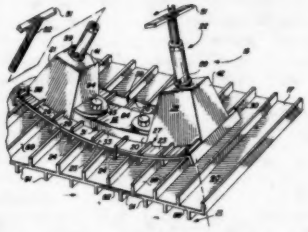
1. A pneumatic tire for motor vehicles comprising:
a circumferentially extending tread having a tread surface for contacting a road surface; and
a plurality of zigzag grooves formed in said tread through said tread surface, wherein each of said zigzag grooves is defined by a first zigzag wall, a bottom and a second zigzag wall, said first zigzag wall and said second zigzag wall being parallel to one another and spaced apart by a predetermined distance, said bottom of each of said grooves being stepped to provide a deep groove bottom substantially parallel to said tread surface and spaced therefrom by a first predetermined depth adjacent one of said first and second walls and a shallow flat groove bottom substantially parallel to said tread surface and spaced therefom by a second predetermined depth adjacent the other of said first and second walls, said first predetermined depth being greater than said second predetermined depth, said shallow flat groove bottom having a substantially constant width measured transverse to said adjacent wall, said deep groove bottom being of a substantially zigzag shape, said zigzag shape being parallel to said adjacent one of said first and second walls, said deep groove bottom and said shallow groove bottom being formed alternately, at opposite sides of the groove, along a straight portion of said first zigzag wall and a straight portion of said second zigzag wall.

4,697,628

VEHICLE HAVING A DUAL DRIVE WHEEL ASSEMBLY AND TRACTION DEVICE

Robert R. Brown, 14633 N. 38th St., Phoenix, Ariz. 85032

Filed Dec. 16, 1985, Ser. No. 809,221
Int. Cl.[4] B60C *27/04*
U.S. Cl. 152—213 R 7 Claims



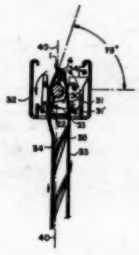
1. In a vehicle having a dual drive wheel assembly each wheel assembly having an axle, a first and second rim mounted on the axle, and a tire mounted in circumscription about each rim, a device for providing traction when said vehicle is mired in a first tractionless position to enable said vehicle to be driven from said first position to a second free moving position, said device comprising: a block assembly and a plate assembly; said block assembly being attachable to said rims within said wheel assembly to secure said block assembly in a fixed position relative to said vehicle wheels for rotation therewith in response to motive power applied thereto, said block assembly having a plate member for engaging a portion of the periphery of said tires in shape conforming relationship thereto, said plate member having a plurality of cleat members extending radially outwardly therefrom; said plate assembly having a body member, a first set of cleats extending upwardly from said body member and a second set of cleats extending downwardly from said body member, said plate assembly being juxtaposed to said wheel assembly in the path of intended travel with said second set of cleats engaging said miring material and said first set of cleats positioned to engage said cleat members of said block assembly as said block assembly cleat members are rotated with said wheel assembly in response to a motive power applied thereto and draw said wheel assembly from its initial tractionless position into a second free moving position.

4,697,629

TILTING DEVICE FOR THE LADDER MEANS OF A VENETIAN BLIND

Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas Inc., Totowa, N.J.

Filed Sep. 27, 1984, Ser. No. 654,924
Int. Cl.[4] E06B *9/32*
U.S. Cl. 160—177 5 Claims



1. A tilting device for a ladder means of a venetian blind where said ladder means comprises a pair of spaced tape cables tiltably supporting slats of the blind therebetween wherein said slats have a predetermined width and wherein said device is adapted to be mounted on a tilt rod having a generally circular cross-sectional shape of predetermined diameter smaller than the width of said slats for oscillatory movement about the longitudinal axis of the rod, characterized in that said device comprises a longitudinally extending central body member through which said tilt rod extends longitudinally, said body member having two symmetrical diametrically opposed arms extending radially outwardly beyond said predetermined diameter in a direction perpendicular to the longitudinal axis of the tilt rod and having outer edges extending parallel to said axis and spaced from each other by a distance substantially equal to the width of said slats, a first cable receiving means in one arm adapted to receive and secure the end of a first tape cable passing over the tilt rod and over the edge of the other arm, a second cable receiving means in the other arm at a position immediately adjacent said first cable receiving means as measured longitudinally along said central body, said second cable receiving means being adapted to receive and secure the end of a second tape cable passing over the tilt rod and over the edge of the one arm, and with the cables passing over the edges

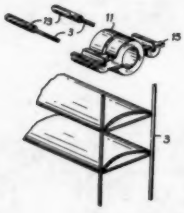
of the arms being symmetrically spaced with respect to the longitudinal axis of the tilt rod and hanging vertically in planes equidistant from a central vertical plane passing through said longitudinal axis when the slats are in a fully opened position with the slats and arms extending horizontally whereby when said device is rotated at a uniform rate by the tilt rod to raise one arm and lower the other, the cables move with a generally progressively slower rate of linear movement in their vertical planes, one upwardly and one downwardly, and the cables in their vertical planes move along a horizontal direction toward the central plane to tilt the slats toward a closed position until the slats are fully closed and the edges of both arms are disposed radially inwardly of the predetermined diameter of the tilt rod as measured along said horizontal direction, and whereby further rotation of the tilt rod beyond the point where the slats are fully closed causes the cable which is moving upwardly to wrap around the tilt rod to stop further movement of said upwardly moving cable toward said central plane and to move said cable at a slower constant rate of linear vertical movement.

4,697,630

TILT MECHANISM FOR VENETIAN BLINDS

Edward T. Rude, Fairfield, Conn., assignor to General Clutch Corporation, Stamford, Conn.

Filed Mar. 17, 1987, Ser. No. 26,963
Int. Cl.[4] E06B *9/26*
U.S. Cl. 160—177 **20 Claims**



1. A tilter for a monocontrol Venetian blind comprising a helix adapted for rotatable disposition about a central rod, each end of said helix being configured for attachment to one leg of a ladder cord.

4,697,631

PROCESS FOR THE PRODUCTION OF AN INGOT

Herbert Bungeroth, Duesseldorf, and Otto Wessel, Duisburg, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 23, 1985, Ser. No. 812,379
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3447557; May 14, 1985, 3517691
Int. Cl.[4] B22D *23/00*
U.S. Cl. 164—46 **14 Claims**

1. A process for forming an ingot having a length at least twice as great as a characteristic sectional dimension thereof, comprising the steps of:

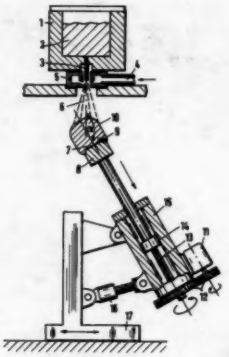
spraying droplets of molten metal from spray means and in a first direction;

positioning an element having a catching surface in the path of said sprayed droplets;

providing a boundary surface adjacent said catching surface;

rotating said catching surface about an axis angularly spaced from said first direction by between 90° and 180°, whereby layers of said sprayed droplets are evenly applied to said catching surface to form a continuous agglomerate and, when said catching surface is covered by said agglomerate, said layers are evenly applied to a catching surface of said agglomerate; and

continuously moving said agglomerate along said axis as said layers are applied and at a rate such that said catching surface remains at a constant distance from said spray



means, whereby a longitudinal ingot surface is formed by said agglomerate layers.

4,697,632

CERAMIC POROUS BODIES SUITABLE FOR USE WITH SUPERALLOYS

Nick G. Lirones, North Muskegon, Mich., assignor to Howmet Turbine Components Corporation, Greenwich, Conn.

Filed Jun. 11, 1982, Ser. No. 387,708
Int. Cl.[4] B22C *9/10*; C21B *7/06*; B01D *39/20*; C04B *38/00*
U.S. Cl. 164—369 **66 Claims**

41. A process for making a ceramic porous body suitable for use with molten metals in general and molten superalloys in particular having a solid, high density, high purity, smooth face which comprises the steps of: providing an open-cell, flexible, foam pattern and a face pattern the size of a face of said foam pattern to be smoothed; coating said face pattern with a ceramic slurry; stuccoing said face pattern with a coarse ceramic material; impregnating said foam pattern with said ceramic slurry; placing said impregnated foam pattern on said coated, stuccoed face pattern such that said impregnated foam pattern and said coated, stuccoed face pattern dry together and become attached; impregnating said attached impregnated foam pattern and coated, stuccoed face pattern with additional ceramic slurry; removing excess dried ceramic down to the edges of said foam pattern; burning out said foam pattern and said face pattern at a temperature of between 1400° F. and 2200° F. to form a ceramic substrate; impregnating said ceramic substrate with additional ceramic slurry; and firing said impregnated ceramic substrate at a temperature of between 2200° F. and 3400° F.

61. A ceramic core suitable for use with molten metals in general and molten superalloys in particular and having a solid,

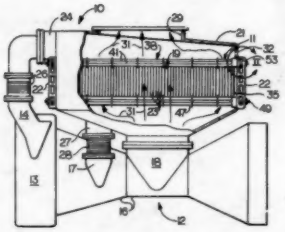
high density, high purity, smooth, exterior face, comprising a ceramic body made from the process of claim 41.

4,697,633

THERMALLY BALANCED RESTRAINT SYSTEM FOR A HEAT EXCHANGER

Charles T. Darragh, San Diego, and Edward L. Parsons, Jr., El Cajon, both of Calif., assignors to Solar Turbines Incorporated, San Diego, Calif.

Filed May 22, 1985, Ser. No. 737,301
Int. Cl.[4] F28F 3/00
U.S. Cl. 165—51 26 Claims



1. In a heat exchanger including a core, a housing surrounding the core and defining a hot fluid flow path through the heat exchanger, a pair of end beams located at opposite ends of the core, and means for interconnecting the end beams so that the core is clamped therebetween, the improvement comprising:

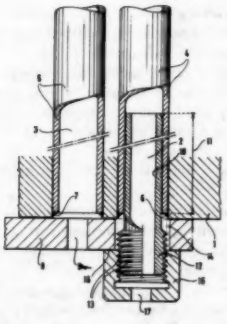
said means for interconnecting including a plurality of tie rods extending through the hot fluid flow path and having opposite ends connected to the end beams, each of said tie rods including a socket adjacent each end and a plurality of small diameter rods extending between and connected to the sockets .

4,697,634

DEVICE FOR FIXING A PERFORATED SHEET AGAINST THE PERFORATED TUBE PLATE OF A HEAT EXCHANGER

Jean-Claude Foucher, Bagneux, and Pierre Devoucoux, Suresnes, both of France, assignors to Stein Industrie, Velizy Villacoublay, France

Filed Mar. 12, 1987, Ser. No. 25,050
Claims priority, application France, Mar. 14, 1986, 86 03692
Int. Cl.[4] F28F 9/02
U.S. Cl. 165—76 2 Claims



1. A device for fixing a perforated sheet against the perforated tube plate of a heat exchanger having a bundle of tubes, said perforated sheet controlling the rate of fluid flow along said tubes, and said device comprising hollow pins inserted in the ends of some of the tubes and expanded therein, said hollow pins terminating outside said tubes with threaded ends onto which respective nuts are screwed for clamping the perforated sheet against the perforated tube plate, said nuts having heads including respective axial fluid-flow controlling bores.

4,697,635

PARALLEL WRAPPED TUBE HEAT EXCHANGER

Ralph C. Longsworth, Allentown, and William A. Steyert, Center Valley, both of Pa., assignors to APD Cryogenics Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 627,958, Jul. 5, 1984, Pat. No. 4,567,943. This application Jan. 14, 1986, Ser. No. 818,832
Int. Cl.[4] F28F 13/08
U.S. Cl. 165—147 4 Claims

1. A heat exchanger of the type having a first confined path for conducting high pressure fluid from an inlet or warm end to a second or cold end and a second confined path for returning the expanded fluid from the point of expansion to the warm end of said heat exchanger comprising in combination:

a low pressure flow path including at least one tube having a first, inlet or warm end and a second or cold end of generally circular cross-section; and

disposed within said low pressure tube at least one high pressure tube, said tube within tube structure progressively flattened from said, first or inlet end to said second or cold end of said.

4,697,636

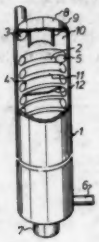
HEAT EXCHANGER WITH HELICAL FLUID FLOW

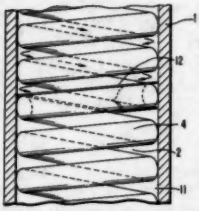
Carl G. Mellsjö, Helsingevaägen 7, Vallentuna, S186 00, Sweden

PCT No. PCT/SE85/00025, § 371 Date Sep. 13, 1985, § 102(e) Date Sep. 13, 1985, PCT Pub. No. WO85/03563, PCT Pub. Date Aug. 15, 1985
PCT Filed Jan. 23, 1985, Ser. No. 777,776
Claims priority, application Sweden, Feb. 3, 1984, 8400566
Int. Cl.[4] F28D 7/10
U.S. Cl. 165—156 6 Claims

1. A heat exchanger for exchanging heat between two fluid media, especially a gas and a liquid, and useful in heat pumps and the like, comprising means defining an elongate generally cylindrical space through which one of said media is to be passed and including a helical pipe coil to carry the other of said media, said pipe coil being disposed at the periphery of said space in such a manner that flow of said one medium along the periphery of said space is confined to a helical flow path running along and having respective turns defined by adjacent surfaces of successive turns of said pipe coil, inlet means disposed toward one end of said cylindrical space for introducing said one medium substantially tangentially into said cylindrical space such that the introduced medium will enter and initially follow said flow path, outlet means disposed toward another end of said cylindrical space for allowing the introduced medium to exit said cylindrical space, and one or more radially slit, substantially helically bent washers each fitted to a respective turn of said pipe coil and substantially blocking the space surrounded by said pipe coil in an axial direction, each said washer having a radial slit configured and disposed to guide

introduced medium which has deviated from said flow path into the space surrounded by said pipe coil outward and back





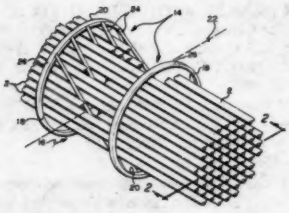
into said flow path to maintain helical circulation of the introduced medium within said cylindrical space.

4,697,637

TUBE SUPPORT AND FLOW DIRECTOR

Richard K. Young, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 2, 1981, Ser. No. 326,777
Int. Cl.[4] F28D *7/00*; **F28F** *9/00, 9/22*
U.S. Cl. 165—160 **20 Claims**



1. Apparatus for supporting tubes in a tube bundle having a longitudinal axis, said apparatus comprising:

a tubular member having a first end and a second end, the first end forming a first arcuate surface and the second end forming a second arcuate surface, said first arcuate surface and said second arcuate surface together forming a pair of arcuate surfaces positioned symmetrically with respect to an axis between the pair and lying in separate planes generally parallel to the axis between the pair; and

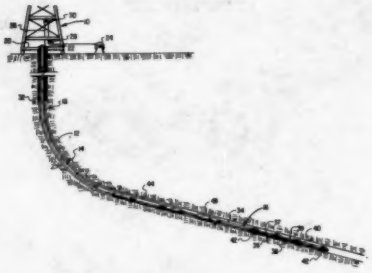
a plurality of straight rods positioned with their midpoints on said axis between the pair and lying in separate generally parallel planes for extending transversely through the tube bundle in a direction which is not normal to the longitudinal axis of the tube bundle, a first end of each rod affixed to the first arcuate surface of the pair of arcuate surfaces and a second end of each rod affixed to the second arcuate surface of the pair of arcuate surfaces.

4,697,638

DOWNHOLE LOGGING AND SERVICING SYSTEM WITH MANIPULATABLE LOGGING AND SERVICING TOOLS

Orien M. Knight, Joshua, Tex., assignor to Gearhart Industries, Inc., Fort Worth, Tex.

Filed Jan. 22, 1986, Ser. No. 821,407
Int. Cl.[4] E21B *43/00*
U.S. Cl. 166—65.1 **25 Claims**



1. Apparatus for performing operations in a well bore, which comprises:

a conveyor adapted for movement into and out of a well bore and for the passage of fluid therethrough;

a fluid operated incremental rotation device including a body connected to said conveyor and a rotating part including a mandrel rotatably mounted in said body, and means positioned in said body for incrementally rotating said mandrel in response to fluid received from said conveyor;

a control device connected to said incremental rotation device and operable by said rotating part of said incremental rotation device;

a tool connected to said control device and operably by said control device to perform downhole operations.

4,697,639

BLOW-OUT PROTECTOR AND FIRE CONTROL SYSTEM FOR PETROLEUM EXPLORATION

Miles F. Caraway, and Bobby L. Caraway, both of Shreveport, La., assignors to Fire-Fox International, Inc., Hinton, W. Va.

Filed Apr. 14, 1986, Ser. No. 851,085
Int. Cl.[4] E21B *33/03, 33/06*
U.S. Cl. 166—82 **7 Claims**

1. A blow-out protector for an oil well comprising

a housing having a vertical passageway therethrough for a Kelly, the housing having a lower end adapter flange to be connected to a well casing,

an elastomeric body having an opening for the Kelly and carried on the Kelly for providing sealing contact with the Kelly and housing passageway,

a catch ring secured to the Kelly and having a surface defined by a given diameter,

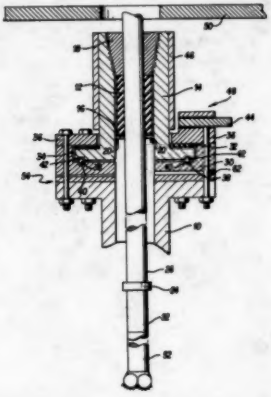
a compressor ring plate positioned below the elastomeric body on the Kelly,

means on an interior of the housing having a given diameter and preventing the compressor ring plate from falling down and yet providing engagement with the surface of the catch ring,

the compressor ring plate having a hole for passage of the Kelly drive-mechanism for the drill pipe,

the catch ring on the Kelly positioned below the compressor plate, the diameter of the catch ring being smaller than the diameter of the interior means on the housing so that when the Kelly is pulled up the catch ring will contact and force

the compressor ring plate against the elastomeric body and force the elastomeric body into tight contact with



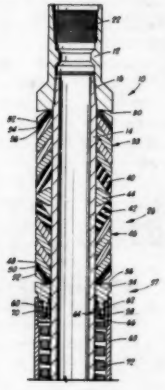
both the Kelly and the housing thus sealing the space between the Kelly and the housing against a blow-out.

4,697,640

APPARATUS FOR SETTING A HIGH TEMPERATURE PACKER

David D. Szarka, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jan. 16, 1986, Ser. No. 820,497
Int. Cl.[4] E21B *33/128*
U.S. Cl. 166—120 **13 Claims**



1. A high temperature retrievable packer for sealing a well bore annulus formed between the casing in the well bore and a string of tubing located therein, comprising:

a mandrel, said mandrel including a first shoulder on the radially outer surface thereof; and a second shoulder located below said first shoulder on the radially outer surface thereof;

a packer element disposed about said mandrel for sealing the annulus between the mandrel and a well bore into which the mandrel is lowered, such sealing occuring in response to compression of said packer element along the longitudinal axis thereof;

a first piston associated with said mandrel and being slideable along the longitudinal axis thereof, said first piston compressing said packer element along the longitudinal axis thereof responsive to an increase in the interior mandrel pressure;

a bi-directional slip assembly disposed about said mandrel for engaging the radially inner surface of said casing of such a well bore, such engaging occurring in response to force applied along the longitudinal axis of said slips, said bi-directional slip assembly including:

a first spreader cone releasably secured to said mandrel, said first spreader cone including a radially inner shoulder thereon, said radially inner shoulder of said first spreader cone for supporting said spreader cone when it is released from engagement from said mandrel by engaging said first shoulder on the radially outer surface of said mandrel;

a second spreader cone;

a bi-directional slip positioned between said spreader cones, said slip being urged radially outwardly as said first spreader cone approaches said second spreader cone; and

a slip cover received over said slip, said slip cover having an opening through which said slip can extend, said slip cover further having a longitudinal slot therein for receiving a pin mounted on said second spreader cone and extending radially outwardly therefrom;

and

a second piston associated with said mandrel and being slideable along the longitudinal axis thereof, said second piston applying force along the longitudinal axis of said slip assembly in response to an increase in interior mandrel pressure to urge said second spreader cone toward said first spreader cone

wherein said second shoulder on said mandrel, said slip cover and said upper spreader cone pin being arranged and contructed to permit releasing said slip by releasing said first spreader cone from said mandrel, pulling upwardly on said mandrel until said second shoulder on said mandrel withdraws said second spreader cone from beneath said slip, and thereafter pulling upwardly on said mandrel until the lower edge of said slip cover opening pulls said slip off of said first spreader cone thereby releasing setting force from said packer element to allow removal of said high temperature retrievable packer from said casing in said-well bore.

4,697,641

SINKER BAR ASSEMBLY

Bill W. White, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Division of Ser. No. 723,773, Apr. 15, 1985, Pat. No. 4,624,308.
This application Jul. 8, 1986, Ser. No. 883,391
Int. Cl.[4] E21B *23/00, 47/00*
U.S. Cl. 166—243 **4 Claims**

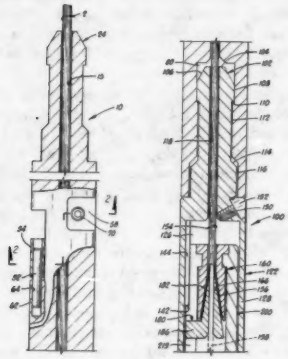
1. A sinker bar assembly for use with downhole tools suspended from a cable in a well bore, comprising:

body means having a longitudinally extending cable bore therethrough from the top to a lower portion thereof;

fishing neck means including a head extending laterally beyond a neck disposed therebelow at the top of said body means; and

fishing neck bore means extending from the bottom of side

body means upward to the lower extent of said cable bore, said fishing neck bore means having a configuration of



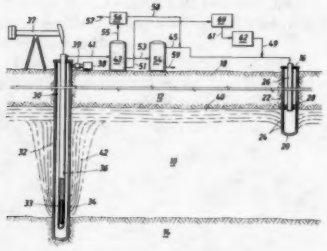
substantially identical size and shape to that of said fishing neck means to receive and secure therein a fishing neck.

4,697,642

GRAVITY STABILIZED THERMAL MISCIBLE DISPLACEMENT PROCESS

John V. Vogel, Seabrook, Tex., assignor to Tenneco Oil Company, Houston, Tex.

Filed Jun. 27, 1986, Ser. No. 879,577
Int. Cl.[4] E21B *43/24, 43/40*
U.S. Cl. 166—263 **24 Claims**



10. A method of recovering viscous hydrocarbons from a subterranean reservoir, said reservoir being penetrated by at least one injection well and one production well, said injection well being in fluid communication with the upper portion of the reservoir and said production well being in fluid communication with the lower portion of the reservoir, said injection well and said production well defining a fluid flow path therebetween, the method comprising the steps of:

(a) injecting a steam-solvent vapor mixture into the upper portion of the reservoir through the injection well, said steam-solvent vapor mixture being undersaturated in solvent and saturated with steam;

(b) reducing the viscosity of the hydrocarbons by heat released upon condensation of the steam-solvent vapor mixture and reducing the viscosity of the hydrocarbons further upon condensation of solvent vapors, the condensed solvent vapors going into solution with the hydrocarbons; and

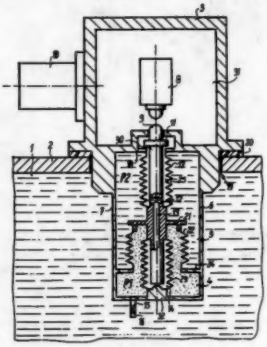
(c) collecting a mixture of hydrocarbons and solvent accumulated at the bottom of the production well substantially entirely under the force of gravity.

4,697,643

TEMPERATURE-COMPENSATED PRESSURE CONTROLLER, OPERATIONALLY RELIABLE EXTINGUISHER PROVIDED WITH SUCH A PRESSURE CONTROLLER AND PROCESS FOR FILLING SUCH A PRESSURE CONTROLLER

Pierre Sassier, Bercheres Sur Vesgre, France, assignor to Thomson CSF, Paris, France

Filed Apr. 21, 1986, Ser. No. 853,922
Claims priority, application France, Mar. 7, 1986, 86 4004924
Int. Cl.[4] A62C *23/08;* H01H *35/32*
U.S. Cl. 169—23 **10 Claims**



1. A temperature compensated pressure controller for a fire extinguisher or other pressurized vessel comprising:

a reference pressure chamber means for holding a predetermined amount of compressible fluid;

a vessel pressure chamber means which is adapted to be in communication with the interior of said fire extinguisher or pressurized vessel;

movable wall means which is mounted to move when the pressure in said reference chamber means differs from the pressure in said vessel chamber means, said movable wall means having an elongate finger integral therewith;

an atmospheric pressure chamber means which is adapted to be communication with the atmosphere;

means for biasing said movable wall means to a predetermined position, said biasing means further acting to separate said elongate finger from said vessel chamber means and to allow communication space defined thereby around said finger with said atmosphere chamber means; and

electric means for producing a signal responsive to displacement of said finger, whereby loss of pressure in said fire extinguisher or pressurized vessel may be detected regardless of the ambient atmospheric pressure.

4,697,644

CULTIVATOR NAIL SUPPORTING STRUCTURE

Sadao Doi; Tohru Yamada; Shungo Matsumoto, and Taizo Yamamoto, all of Kohchi, Japan, assignors to Taiyo Tanko Co., Ltd., Kohchi, Japan

Filed Jan. 2, 1986, Ser. No. 815,626
Claims priority, application Japan, Mar. 29, 1985, 60-44964[U]
Int. Cl.[4] A01B *33/02, 33/14*
U.S. Cl. 172—123 **3 Claims**

1. A supporting structure for a cultivator blade of the type having a blade portion with an integral shank, said supporting structure comprising:

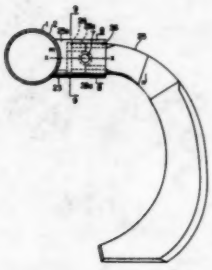
a rotatable driving shaft;

a blade holder fixed to and extending radially from said

shaft, said holder having an elongated cavity suitably dimensioned and configured to receive said shank therein;

a pin extending through aligned apertures in said holder and a blade shank received in said cavity, said cavity and said shank being dimensioned to accommodate limited rotational movement of said shank relative to said holder about the axis of said pin;

said cavity being defined in part by two sets of confronting oppositely inclined pressure surfaces and by confronting parallel stop surfaces, the said two sets of pressure surfaces



being arranged in a non-opposed relationship on opposite sides respectively of both the longitudinal axis of said cavity and the axis of said pin at locations such that upon rotation of said shank about the axis of said pin in a direction opposite to the direction of rotation of said shaft, first portions of said shank will rotate between and into wedged engagement with said sets of inclined pressure surfaces, with the extent of rotation of said shank relative to said holder being limited by the abutment of second portions of said shank against said stop surfaces.

4,697,645

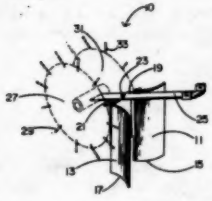
DISC CULTIVATOR SHIELD

Sidney G. Jiskoot, R. R., Sanborn, Iowa 51248

Filed Jan. 21, 1986, Ser. No. 820,026

Int. Cl.[4] A01B *39/26*

U.S. Cl. 172—510 **2 Claims**



1. A disc cultivator shield comprising:

a dual disc cultivator, said discs being rotatably supported in laterally spaced relation on an axle;

a tongue attached to and extending outward from the axle of the dual disc cultivator;

mounting bracket means rigidly attached to and extending downwardly from opposite sides of the tongue;

a first vertically extending shield adjustably attached to one side of the mounting means positioned adjacent the forward edge of said disc; and

a second shield adjustably attached to the other side of the mounting means for cooperating with the first shield to funnel growing crops between said discs and away from passing underneath the discs during the cultivation process.

4,697,646

DEEP TILLAGE SWEEP

William M. Johnson, Winchelsea, and Ilmar Mere, St. Marys, both of Australia, assignors to Ralph McKay Limited, Maidstone, Australia

Filed Mar. 27, 1985, Ser. No. 716,622

Claims priority, application Australia, Mar. 30, 1984, PG4343

Int. Cl.[4] A01B *35/20, 39/20*

U.S. Cl. 172—730 **3 Claims**

1. An earth engaging implement comprising an earth engaging portion located forwardly and below a socket, which socket is tapered in cross section from its top toward its junction with the earth engaging portion, said socket having an opening at its top and down its length said socket comprising a face and a pair of opposing flanges extending from said face with one of said flanges bounding each side of said face and forming a junction therewith, said socket having at least two reinforcing ribs with one of said ribs in each of said flanges in the upper region of said socket and extending toward the junction of each of said flanges with said face, said ribs being located relative to the opening of said socket such that said ribs are adjacent the greatest curvature in the cross section of the socket to increase resistance to bending of said flanges by forces applied to said earth engaging portion.

4,697,647

REVERSIBLE PERCUSSIVE ACTION MACHINE

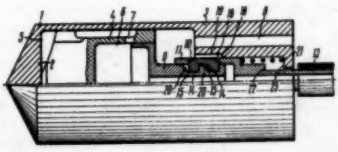
Alexandr D. Kostylev; Vladimir D. Plavskikh; Konstantin B. Skachkov; Alexei D. Terskov, all of Novosibirsk; Igor I. Reznikov, and Vladimir I. Tarasenko, both of Odessa, all of U.S.S.R., assignors to Institut Gornogo Dela Sibirskogo Otdelenia Akademii Nauk SSSR, Novosibirsk, U.S.S.R.

Filed Dec. 11, 1985, Ser. No. 807,587

Claims priority, application U.S.S.R., Feb. 21, 1985, 3851625

Int. Cl.[4] E21B *11/02*

U.S. Cl. 173—91 **2 Claims**



1. A reversible percussive action machine comprising:

a housing;

a hammer accommodated inside said housing for executing reciprocating motions under the action of a working fluid under pressure;

a system for distributing said working fluid under pressure to reciprocate said hammer and deliver impacts on a front portion of said housing for forward travel of the machine

and to deliver impacts on a rear portion of said housing for reverse travel thereof;

a valving member of said system for distributing the working fluid arranged in said housing, said valving member being movably mounted on said hammer;

means for fixing said valving member in two positions relative to said housing, particularly, one position for the forward travel of the machine and one position for the reverse travel of the machine, said means for fixing the valving member including at least one insert having projections;

said valving member having on a side surface grooves with slanted surfaces for cooperation with said projections of said insert;

a shell with ports, said insert being located in each of said ports and said shell being secured between said housing and said valving member;

said insert being movable radially with respect to said shell and siad insert being movable radially and axially with rspect to said valving member,

said insert cooperating with said grooves of said valving member by said projectiosn which slant corresponding to the slanted surfaces of said grooves, and

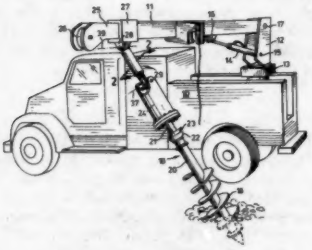
a spring in said housing for axially urging said housig relative to said valving member.

4,697,648

SPRING-LOADED SUSPENSION SYSTEM FOR AUGERS AND SCREW ANCHORS

Bernd A. Brandt, 108 Sylvan Avenue, Scarborough, Ontario, Canada M1M 1K3

Filed Sep. 24, 1985, Ser. No. 782,918
Int. Cl.[4] E21B *17/07*
U.S. Cl. 173—162 R **4 Claims**



1. A spring-loaded suspension system for a rotary boring tool to be driven into the ground, the tool being suspended from a derrick boom, comprising

a drive assembly having a stationary casing housing a motor and having a rotary output shaft extending from the casing,

coupling means for coupling the tool to the output shaft coaxially therewith so as to be driven thereby, and

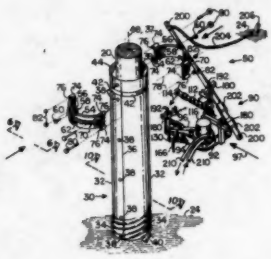
linkage means articulately interconnecting the casing of the drive assembly with the boom, said linkage means providing a pair of pivots having mutually perpendicular axes defining a universal pivotal connection between the casing and the boom, said linkage means comprising a telescopic link formed by an outer tubular member, a piston member slidably and non-rotatably mounted within the tubular member, and opposed compression springs acting on opposite sides of the piston member thereby to cushion telescopic extension and contraction of the link, said members being pivotally connected by said pivots to the derrick boom and to the casing of the drive assembly respectively, for pivotal movement about said mutually perpendicular axes.

4,697,649

PORTABLE APPARATUS FOR AND METHOD OF POLE REINFORCEMENT

Frank R. Kinnan, Camas Valley, Oreg., assignor to Utilitech, Incorporated, Walnut Creek, Calif.

PCT No. PCT/US84/01295, § 371 Date Oct. 15, 1984, § 102(e) Date Oct. 15, 1984, PCT Pub. No. WO86/01251, PCT Pub. Date Feb. 27, 1986
PCT Filed Aug. 15, 1984, Ser. No. 674,538
Int. Cl.[4] E02D *5/56;* **E21B** *3/02, 7/20;* **E04H** *12/22*
U.S. Cl. 175—19 **19 Claims**



1. An apparatus for installing an inground support footing around the subterranean portion of an upstanding, elongate object, such as a structural pole, post or the like and around the immediately adjacent above-ground portions thereof, for increasing the object's structural integrity, by driving a hollow, cylindrical casing means into the ground to a preestableshed depth about the subterranean portion of the elongate object, said casing means surrounding the elongate object and having its central, cylindrical longitudinal axis aligned generally parallel to the elongate object's longitudinal axis, said casing means being formed with a cutting means located at one end thereof which cutting means end of said casing means is prepositioned concentrically around the immediately above-ground portion of the elongate object with the casing's cutting means engaging the ground, said apparatus comprising:

split casing rotaty drive means as may be rigidly locked circumferentially about said casing means for coupling a torque to said casing means, which torque urges said casing means to rotate about its longitudinal axis;

rotary driver means as may mate with, engage and be supported upon said split casing rotary drive means for applying a torque thereto whereby said casing means may be urged to rotate about its longitudinal axis and to be thereby driven into the ground to a preestablished depth about the subterranean portion of the elongate object; and

wherein said split casing rotary drive means includes a plurality of mating, arcuate shaped shells which upon being assembled together may be locked circumferentially about and encircle said casing means, the outer, circumferential surface of said assembled shells furthest from said casing means being adapted to mate with, engage, and support said rotary driver means for applying torque to said split casing rotary drive means.

8. A casing means as may be installed as an in-ground support footing around the subterranean portion of an upstanding, elongate object, such as a structural pole, post or the like and around the immediately adjacent above-ground portions thereof, for increasing the object's structural integrity, said casing means comprising:

first and second elongated partial cylinders formed respectively with substantially equal radii, each partial cylinder being formed with a partial helical thread means located about one of its ends, each partial cylinder also being formed to mate with the other for assembly into a unitary, hollow cylinder surrounding the elongate object whereby an annulus may be established between the innermost,

cylindrical surfaces of said partial cylinders and the immediately adjacent exterior surface of the elongate object, said assembled partial cylinders being disposed so each helical thread means thereof is respectively located beneath the remainder of said partial cylinder on which said helical thread means is formed, said assembled partial cylinders further including cutting means located about said helical thread means for engagement with the ground surrounding the subterranean portion of the elongate object, said cutting means being adapted for drawing said casing means downward into the ground as said casing means is rotated about its longitudinal axis; and

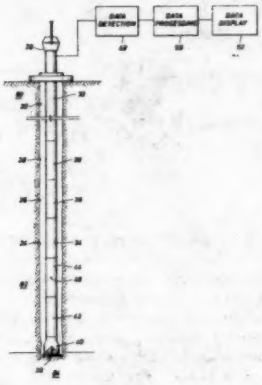
wherein said cutting means includes a flat tooth projecting downward beneath the helical thread means of the partial cylinders, said tooth being secured to said partial cylinder at an angle with respect to the threads of said helical thread means which adapts said tooth for assisting said helical thread means in drawing said casings means downward into the ground.

4,697,650

METHOD FOR ESTIMATING FORMATION CHARACTERISTICS OF THE EXPOSED BOTTOMHOLE FORMATION

John E. Fontenot, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Filed Sep. 24, 1984, Ser. No. 654,186
Int. Cl.[4] E21B *47/00*
U.S. Cl. 175—50 **17 Claims**



1. A method for estimating a value of a property of a formation face being penetrated at a bottomhole location in a borehole by a drill bit in a drilling operation, comprising the steps of:

constructing a data base comprising a plurality of reference sets of correlated values, each said set corresponding to a known location within a borehole, each said set including a reference value indicative of said known location for each of a plurality of properties, said constructing comprising,

measuring, while penetrating at each said known location, a value indicative of a first property of a formation face being penetrated at each said known location,

measuring, later after drilling has progressed below each said location, a value indicative of a second property of a formation surrounding each said location, and

correlating said measured values for said first and second properties for each said location to form each said reference set in said data base;

measuring, while penetrating at a new bottomhole location in said borehole, a test value indicative of said first property of a new formation face being penetrated at said new bottomhole location; and

comparing said test value with said data base to provide an estimated value of said second property at said bottomhole location.

13. An apparatus useful for estimating a value of a property of a formation face being penetrated at a bottomhole location by the drill bit in a drilling operation, comprising in combination:

means for storing a data base comprising a plurality of sets of values of correlated formation properties, each set comprising values for at least first and second properties for a known location within a borehole, each said first property obtained by measuring, while penetrating at said location, and each said second property obtained by measuring, later after drilling has progressed below said location;

means for measuring, while penetrating at said bottomhole location, a value indicative of said first property of a formation face being penetrated at said bottomhole location; and

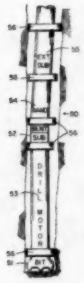
means for comparing said measured value of said first property at said bottomhole location to the corresponding value of said first property of each set in said data base to identify a set of values whose value of said first property most closely approximates said measured value to estimate a value of said second property at said bottomhole location.

4,697,651

METHOD OF DRILLING DEVIATED WELLBORES

Thomas B. Dellinger, Duncanville, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 22, 1986, Ser. No. 944,737
Int. Cl.[4] E21B *7/08*
U.S. Cl. 175—61 **10 Claims**



1. A method of drilling a deviated wellbore into the earth by a rotary drilling technique wherein a drill tool is used to advance a drill bit through the earth and a drilling fluid is circulated down the drill tool and returned from the wellbore in the annulus formed about the drill string, comprising:

(a) drilling a vertical first portion of said wellbore into the earth from a surface location to a kick-off point at about the lower end of said first portion by rotating and advancing said drill tool and drill bit into the earth,

(b) initiating a second portion of said wellbore at said kick-off point,

(c) withdrawing said drill tool and drill bit from said vertical first portion of said wellbore,

(d) running into said vertical first portion of said wellbore a drill tool for drilling said deviated second portion of said wellbore, said drill tool being comprised of a drill string having affixed to its lower end a bottom-hole assembly including a drill bit, a motor for rotating said drill bit independently of said drill string, a bent sub for directing the axis of rotation of said drill bit such that it is angularly

displaced from the axis of said drill string, an orientation device for sensing the rotation of said bottom-hole assembly, and an extension sub having both contracted and extended positions for providing weight to said drill bit during movement from said contracted to said extended position,

(e) positioning said drill tool such that said drill bit is a predetermined distance above the wellbore bottom,

(f) imparting both rotation and a rapid dynamic movement downward to said drill tool such that said drill bit impacts the wellbore bottom and places said extension sub in a contracted position,

(g) raising said drill tool so that said drill bit is no longer in contact with the wellbore bottom,

(h) rotating said bottom-hole assembly so that the axis of rotation of said drill bit is at a desired angular orientation with respect to the axis of said drill string,

(i) producing a drilling stroke of said drill bit into the earth below the wellbore bottom by simultaneously maintaining said drill string stationary, rotating said drill bit under control of said drill motor, and advancing said drill bit under the weight provided by said extension sub in moving from said contracted position to said extended position, and

(j) repeating steps (e) through (i) so as to provide additional drilling strokes for the drilling of said deviated wellbore.

4,697,652

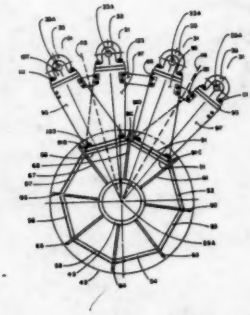
REVERSIBLE ROLLER STABILIZER EXTENSIONS FOR EARTH BORING HEAD

Howard J. Walk, Arlington, Tex., assignor to Reed Mining Tools, Inc., Grand Prairie, Tex.

Filed Sep. 19, 1986, Ser. No. 909,273

Int. Cl.[4] E21B *3/00*; E21C *9/00*

U.S. Cl. 175—325 **16 Claims**



1. A stabilizer apparatus for stabilizing a head having cutters mounted thereon for drilling a hole in the earth upon rotation of the head by way of a stem, comprising:

a hub adapted to be coupled to the stem for rotation therewith,

said hub having a plurality of mounting surfaces located angularly around its axis and radially outward therefrom,

a plurality of extension brackets,

each extension bracket having a bracket mounting plate means at one end and a roller mounting plate means at the other end,

a roller means attached to each of said roller mounting plate means for engaging the earth for stabilizing the head,

the axis of each of said roller means defining a scalene triangle with two side edges of the bracket mounting plate means of its extension bracket,

the bracket mounting plate means of each of said extension brackets being adapted to be attached to any of said mounting surfaces in a first position or turned 180° and attached thereto in a second position such that the axis of its roller means is parallel to the axis of said hub and is located either on one side or the other of a plane extending from the length of the axis of said hub outward and bisecting said bracket mounting plate means between its two side edges when said bracket mounting plate means is attached to any of said mounting surfaces in said first or second positions,

each of said hub mounting surfaces having one of said extension brackets attached thereto in one of said positions by way of its bracket mounting plate means in at least one plane transverse to said axis of said hub whereby said extension brackets will rotate with said hub when said hub is rotated by the stem.

4,697,653

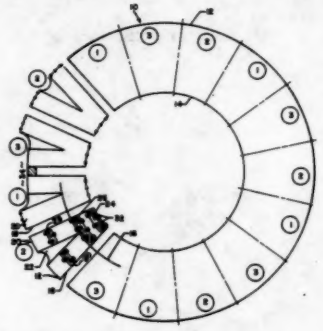
DIAMOND SETTING IN A CUTTING TOOTH IN A DRILL BIT WITH AN INCREASED EFFECTIVE DIAMOND WIDTH

Lynn Peterson, West Jordan, Utah, assignor to Eastman Christensen Company, Salt Lake City, Utah

Filed Mar. 7, 1986, Ser. No. 837,546

Int. Cl.[4] E21B *10/46*

U.S. Cl. 175—329 **16 Claims**



1. A cutting tooth for use in a drill bit having a bit surface, said tooth characterized by a cutting direction, comprising:

a single tooth body raised above said bit surface; and

a plurality of cutting elements disposed within said body, said plurality of cutting elements forming a sequence of elements extending along said cutting direction of said cutting tooth, each cutting element of said sequence including at least a portion of said element extending in a nonparallel direction to said cutting direction and having a nonoverlapping projection in said cutting direction with respect to the preceding cutting element within said sequence to define a nonoverlapping extent of said element,

whereby the effective area of said cutting elements made available for cutting action within said tooth is substantially increased over that area available from a single one of said cutting elements.

4,697,654

ROTARY DRILL BITS

John D. Barr, Cheltenham, England, and Malcolm R. Taylor, Houston, Tex., assignors to NL Petroleum Products Limited, Gloucestershire, England

Filed Jul. 12, 1985, Ser. No. 754,570

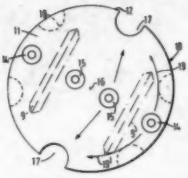
Claims priority, application United Kingdom, Jul. 19, 1984, 8418482

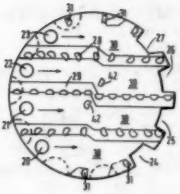
Int. Cl.[4] E21B *10/46, 10/60*

U.S. Cl. 175—329 **29 Claims**

1. A rotary drill bit for use in drilling holes in subsurface formations comprising a bit body having a leading face and a

gauge region, cutting elements mounted at the surface of the leading face of the bit body, a passage in the bit body for supplying drilling fluid to a plurality of openings in the leading face of the bit body, and at least one junk slot in the gauge region of the bit body associated with each such opening in that the leading face of the bit body provides at least one flow path from said opening to the associated junk slot, whereby drilling fluid emerging from said openings flows over the leading face of the bit body and past cutting elements thereon, so as to cool and clean the cutting elements before exiting through said junk slot, at least one of said openings being a peripheral opening located in an area of the leading face adjacent the gauge region, said peripheral opening being angularly spaced from the nearest associated junk slot, and the shortest distance between said opening and the gauge region, measured over the leading surface of the bit being less than ½ of the shortest distance between said opening and said nearest associated junk slot, whereby said one flow path between said peripheral opening and said nearest associated junk slot extends mainly peripherally along the outer peripheral region of the leading face of the bit, adjacent the gauge region, said one flow path offering less resistance to fluid flow than any path extending mainly radially outwardly from said peripheral opening to the gauge region, and wherein a plurality of said cutting elements are disposed generally in said one flow path from said





peripheral opening to said nearest associated junk slot so that fluid in said one flow path flows peripherally past said plurality of cutting elements in said peripheral region.

23. A rotary drill bit for use in drilling holes in subsurface formations comprising a bit body having a leading face and a gauge region, a plurality of cutting elements mounted at the surface of the leading face of the bit body, a passage in the bit body for supplying drilling fluid to a plurality of openings in the leading face of the bit body, and at least one junk slot in the gauge region of the bit body, whereby drilling fluid emerging from said openings flows over the leading face of the bit body and past the cutting elements thereon, so as to cool and clean the cutting elements before exiting through said junk slot, at least one of said openings being a peripheral opening located in an area of the leading face adjacent the gauge region, said peripheral opening being angularly spaced from the nearest associated junk slot, and the shortest distance between said opening and the gauge region, measured over the leading surface of the bit, being less than ½ of the shortest distance between said opening and said nearest associated junk slot, whereby the flow path between said peripheral opening and junk slot is such that, in normal use of the bit, drilling fluid flowing from the opening to that junk slot flows substantially peripherally along the outer peripheral region of the leading face of the bit, adjacent the gauge region so as to flow past cutting elements in said peripheral region, wherein substantially all of the openings in the leading face of the bit body lie on the opposite side of a diameter of the bit body to substantially all of the junk slots.

4,697,655

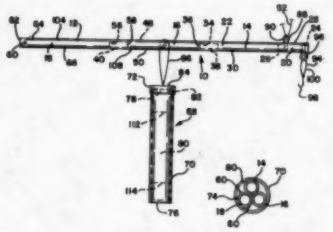
PORTABLE WEIGHING DEVICE

Ronald J. Junkas, 38W108 Rosewood La., Batavia, Ill. 60510

Filed Nov. 4, 1986, Ser. No. 926,537

Int. Cl.⁴ G01G *21/28, 1/18*

U.S. Cl. 177—127 **5 Claims**



1. A portable weighing device comprising:

a receptacle including a hollow container with an open end to provide access to an inner space and a cap with an attached cord loop prepared for assembly to said container to close said container open end,

a rod pivot end section carried in said container inner space,

a rod middle section carried in said container inner space,

a rod outer end section carried in said container inner space with said rod sections prepared for removal from said container for selective assembly into a balancing rod having numerical values on one side to define a first weighing scale and further numerical values on an opposite side to define a second weighing scale,

an object fitting carried in said container inner space and including a fastener prepared for assembly in an aperture formed in said rod pivot end section adjacent to an outer end of such with said aperture extending between said rod section sides, and

a pivot fitting carried in said container inner space and including a fastener prepared for assembly in an aperture formed in said rod pivot end section spaced inward from said object fastener aperture with said pivot fastener aperture extending between said rod section sides,

wherein said rod sections and said fittings may be conveniently stored in said receptacle for subsequent removal for selective assembly into said weighing device.

4,697,656

DEVICE FOR WEIGHING INDIVIDUALS ON A TOILET SEAT

Emmanuel de Canecaude, 4 bis, rue Albert Joly, F-78000 Versailles, France

PCT No. PCT/FR85/00071, § 371 Date Apr. 9, 1986, § 102(e) Date Apr. 9, 1986, PCT Pub. No. WO85/04472, PCT Pub. Date Oct. 10, 1985

PCT Filed Apr. 1, 1985, Ser. No. 810,384

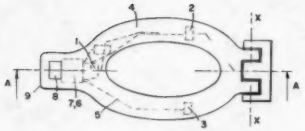
Claims priority, application France, Apr. 2, 1984, 84 05171; Dec. 17, 1984, 84 19294

Int. Cl.⁴ G01G *19/52, 5/04*

U.S. Cl. 177—144 **10 Claims**

1. Device for weighing individuals on a toilet seat, comprising a seat (4) and a cover hinged on a support fastened to a bowl (11), means for measurement of the user's weight made solid with seat (4) made to rest on the upper edge of bowl (11), said measuring means work with a means (8) for displaying the user's weight, the hinge of the seat is provided with an oblong

hole or with sufficient play to avoid disturbing the measurement, characterized in that means for measurement of the user's weight consist of three active strain gage blades mounted in series on a Wheatstone bridge together forming a sensor, said blades are oriented toward the epicenter of seat (4), and the part of the support of said blades in contact with the



bowl is of semirigid material, and said sensor works with an electronic unit comprising means for formatting the measurement signal and for transmission to a digital weight display means (8, 13) placed on a front extension (9) of the seat, and the seat is overfilled on a rigid metallic structure, and hinge (56) of cover (55) is fastened on a support (57) outside of the seat.

4,697,657

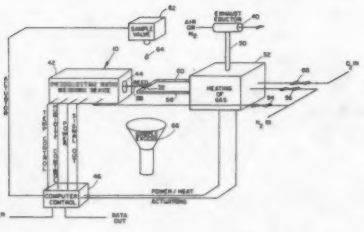
PIEZOELECTRIC WEIGHING DEVICE

Joe L. Portman, Jr., 1423 Escalon, San Antonio, Tex. 78221, and David J. Margraf, 1492 Cloud La., New Braunfels, Tex. 78130

Continuation-in-part of Ser. No. 789,515, Oct. 21, 1985, Pat. No. 4,623,030. This application Nov. 17, 1986, Ser. No. 931,660

Int. Cl.[4] G01G *3/14, 19/00;* **H01L** *41/04*

U.S. Cl. 177—210 FP **41 Claims**



1. A device for determining the weight of a first sample comprising:

a base;

a piezoelectric driver anchored by a first part thereof to said base;

means for supplying an AC voltage to said piezoelectric driver to cause a second part of said piezoelectric driver to vibrate upon receiving said AC voltage;

a piezoelectric receiver mechanically linked to, but electronically isolated from, said piezoelectric driver to transmit vibrations from said piezoelectric driver to said piezoelectric receiver;

means for applying, directly or indirectly, said first sample to receive said vibrations from said piezoelectric driver, said first sample vibrating with said piezoelectric driver;

means for receiving output signals from said piezoelectric receiver, said output signals being representative of said vibrations transmitted from said piezoelectric driver;

frequency of said AC voltage from said supply means being adjusted to set overall operating frequency of said device immediately adjacent one side of a resonant frequency, thereafter said first sample being applied to said applying means to give an output signal from said piezoelectric receiver, comparing said output signal to a calibrated signal to give the absolute weight of said first sample.

4,697,658

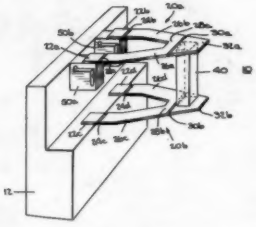
TOGGLE-TYPE ADJUSTABLE MOUNTING FOR WEIGHING SCALE FLEXURES

Daniel G. Scheffer, Rockaway Township, Morris County, and Marilyn A. Brock, Morris Plains, both of N.J., assignors to Ohaus Scale Corporation, Florham Park, N.J.

Filed Aug. 4, 1986, Ser. No. 892,812

Int. Cl.[4] G01G *3/08, 23/14*

U.S. Cl. 177—229 **8 Claims**



1. Apparatus for adjusting the position of a flexure mounting in a weighing scale having a base and at least one flexure mounting comprising:

toggle means having a base portion, an input portion, and an output portion, a relatively large displacement of the input portion relative to the base portion causing a relatively small displacement of the output portion relative to the base portion;

means for connecting the base portion to the base of the weighing scale;

means for connecting the flexure mounting to the output portion; and

control means for moving the input portion relative to the base;

wherein the input portion comprises a bendable longitudinal first member connected at one end to the base portion and at the other end to the output portion so that bending of the first member causes displacement of the output portion parallel to the longitudinal axis of the first member.

4,697,659

VEHICLE FRACTION ATTACHMENT

Tony J. Zimmerman, 411 E. Main St., Stuarts Draft, Va. 22447

Filed Apr. 24, 1986, Ser. No. 855,281

Int. Cl.[4] B60B *15/00*

U.S. Cl. 180—15 **11 Claims**

1. An attachment for vehicles having at least one driven axle, the attachment comprising,

a bracket fixedly connectable to a vehicle rear axle housing,

a frame axle connected to the bracket,

a frame assembly pivotally connected to the frame axle at one end and having a substantially horizontal orientation,

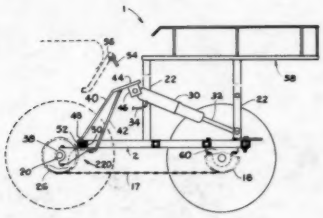
a drivable axle connected to the opposite end of the frame assembly,

a first sprocket adapted to be connected to a driven axle of the vehicle,

a second sprocket connected to the drivable axle,

a chain connecting the first and second sprockets thereby imparting motion in the drivable axle in response to motion in the vehicle rear axle,

a support arm connected to the bracket and extending upwardly from the bracket, and



a shock absorber connected to an upper end of the support arm and to the frame assembly for supplying downward force on the drivable axle, wherein the upper end of the support arm is adapted to abutt the frame assembly to limit pivotal upward movement of the frame assembly with respect to the bracket.

4,697,660

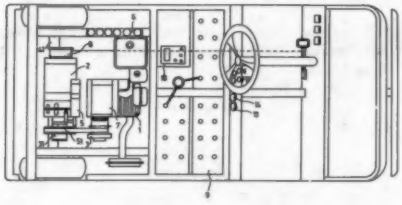
VEHICLE WITH MULTIPLE POWER SOURCE

C. H. Wu, and Gerald P. T. Wu, both of Hsiang San Hsiang No. 30, Hsiang San Keng, Hsinchu, Taiwan

Filed Oct. 31, 1985, Ser. No. 793,662

Int. Cl.[4] B60K *5/04*

U.S. Cl. 180—65.2 **10 Claims**



1. A multiple power source vehicle comprised of:

at least two power sources;

at least two output shafts, one each of said output shafts being connected to one each of said power sources;

at least one belt-driven continuously variable torque converter; and

at least one solenoid clutch means, said belt-driven continuously variable torque converter being disposed between said two output shafts and said clutch means being disposed adjacent said belt-driven continuously variable torque converter for shifting power transmission between the output shaft of one of said power sources and the output shaft of the second of said power sources, said output shafts being connected parallel of one another.

4,697,661

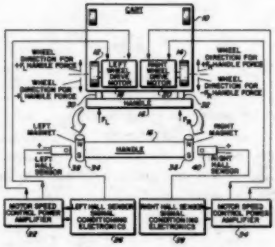
DRIVE DESIGN FOR MOBILE X-RAY UNITS WITH DUAL WHEEL DRIVES

Michael J. Pajerski, Waukesha; Steven J. Gray, Mukwonago; Gerald K. Flakas, Oconomowoc, and Dennis J. Cotic, Waukesha, all of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Jul. 14, 1986, Ser. No. 885,484

Int. Cl.[4] B62D *11/04*

U.S. Cl. 180—6.5 **9 Claims**



1. A control system for providing power to at least one pair of independently driven wheels of a power driven cart for transporting medical diagnostic equipment, the control system comprising:

a manually engageable handle having first and second ends and being mounted to the cart in a position allowing a manual force to be exerted on the handle substantially in a direction in which movement of the cart is desired;

force responsive means coupled to said handle for sensing the manual force applied to said handle in a horizontal plane substantially parallel to said direction of movement, said force responsive means providing signals representative of the magnitude and direction of the manual force applied to each of said first and second ends of said handle;

means responsive to the signals for actuating the control system to provide the power to the driven wheels independently for controlling the direction and velocity of movement of the cart; and

said handle comprising a bar having pivotable mounts at each of said first and second ends, said force responsive means including first and second cantilevered arms each having one end fixedly mounted to the cart adjacent a corresponding one of said first and second ends of said handle, a second end of each of said arms being coupled to a corresponding one of said pivotable mounts, the manual force applied to said handle causing a bending of said arms, said force responsive means further including means responsive to the magnitude and direction of bending for producing said magnitude and direction signals.

4,697,662

DRIVEN AXLE FOR COMMERCIAL VEHICLES

Willi Zollmeyer, Esslingen, and Friedrich Scheurer, Ostfildern, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Apr. 21, 1986, Ser. No. 853,944

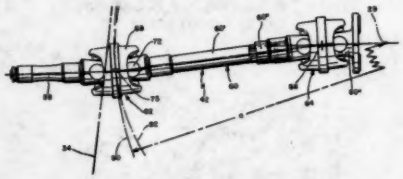
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514146

Int. Cl.[4] B60K *20/00*

U.S. Cl. 180—71 **3 Claims**

1. A driven axle arrangement for a vehicle having independently guided wheels, which has a wheel guided by a wheel bearer, a wheel shaft mounted in the wheel bearer and a first double universal joint adjoining the wheel shaft, the first double universal joint having a movable side and a fixed side, the movable side being on the wheel bearer side of the first double universal joint, the movable side having an axial displacement

path in the transverse direction of the vehicle which depends on the flexure angle of the first double universal joint, the axle also having axially displaceable drive shafts articulated between the first double universal joint and a second double universal joint, wherein the distance between a center of rotation of said wheel bearer and said first double universal joint is greater than the distance between said first and second double universal joints, whereby the axial displacement of the first double universal joint is substantially reduced during flexure of the first double universal joint.



4,697,663

THREE-WHEELED VEHICLE

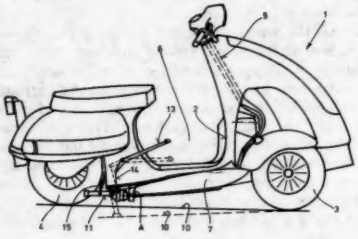
Wolfgang Trautwein, Droste-Weg 5, D-7758 Meersburg, Fed. Rep. of Germany

Filed Sep. 12, 1985, Ser. No. 775,509

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1984, 3433986

Int. Cl.[4] B62D *61/06*

U.S. Cl. 180—210 **10 Claims**



1. A three-wheeled vehicle with driven rear wheel typical of a motorcycle and two steerable front wheels spaced symmetrically to the left and right of the vehicle's longitudinal axis, the front wheels being supported by a suspension with cross members in parallelogram manner, the vehicle further comprising a main vehicle frame and a platform extending rearward from a lower one of said cross members on both sides of the main vehicle frame which interconnects at front wheel suspension and the rear wheel, said main frame being pivotally connected to said cross members and to said platform; what is claimed is a U-shaped center stand pivotally connected to the vehicle platform with its pivoting axis perpendicular to the longitudinal axis; operating means connected to the mainframe, said operating means being interconnected to said center stand; and said center stand locking said main frame with respect to the platform when activated.

4,697,664

SCOOTER TYPE MOTORCYCLE

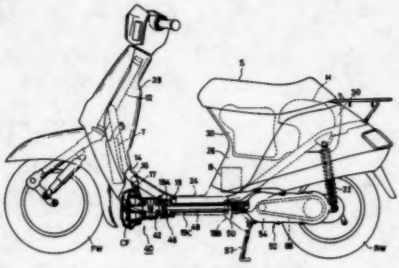
Mikihiro Kohyama, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 18, 1985, Ser. No. 777,470

Claims priority, application Japan, Sep. 18, 1984, 59-193859

Int. Cl.[4] B62K *11/04*

U.S. Cl. 180—226 **16 Claims**



1. A scooter comprising

a body having a low bed footboard, a rear cover rearwardly of said low bed footboard and a front cover forwardly of said low bed footboard;

a engine fixed beneath a forward position of said low bed footboard;

a transmission beneath said rear cover rearwardly of said low bed footboard;

a power transmission means including a drive shaft for conveying power from said engine to said transmission extending between said engine and said transmission beneath said low bed footboard, siad engine including a crankshaft and a cylinder, the axis of said crankshaft extending substantially longitudinally of said body and the axis of said cylinder extending substantially transversely of said body; and

said transmission being pivotably mounted about a transverse axis located substantially between said power transmission means and said transmission.

4,697,665

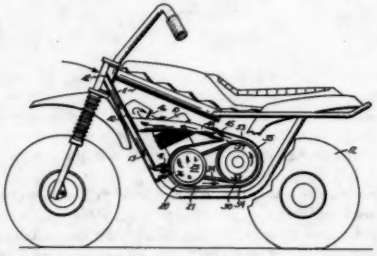
RECREATIONAL VEHICLE WITH AIR COOLED TRANSMISSION

Robert A. Eastman; Larry D. Rugland, and Edwin M. Monsrud, all of Roseau, Minn., assignors to Polaris Industries, Inc., Roseau, Minn.

Filed Jun. 18, 1985, Ser. No. 745,895

Int. Cl.[4] F16H *57/04*

U.S. Cl. 180—230 **15 Claims**



1. A vehicle comprising a frame; an engine mounted to the frame; driven wheels carried by the frame for propelling the vehicle; variable speed transmission means for operatively

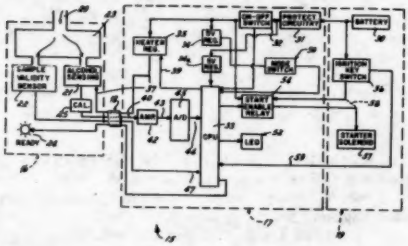
linking the engine to the driven wheels, said transmission means including a drive pulley and a driven pulley each having a pair of sheaves and one of each pair of sheaves having a plurality of air-propelling fins on the back side thereof, and a housing enclosing said transmission means, the housing having an intake port for admitting air therein and an exhaust port for exhausting air therefrom, said ports being oriented with respect to the pulleys to facilitate air movement through the housing; and air conduit means sealingly engaged to the ports for directing air toward and away from the respective ports, said air conduit means including an exhaust tube having a first end sealingly engaged to the housing exhaust port and a second end oriented in a relatively high position with respect to the variable speed transmissiona means.

4,697,666

SOBRIETY INTERLOCK WITH TIME-LOCKED INTERLOCK MODE

Donald W. Collier, Chicago, Ill., and Kip L. Fuller, Denver, Colo., assignors to Guardian Interlock Systems, Inc., Denver, Colo.

Filed Sep. 16, 1986, Ser. No. 908,036
Int. Cl.[4] B60R *25/04*
U.S. Cl. 180—272 **9 Claims**



1. A method of controlling a machine sobriety interlock system of the type operable to disable a machine connected to the interlock unless a prospective operator of the machine, passes a breath sobriety test, comprising the steps of:

(a) sensing the selection of alternative bypass and interlock modes of operation;

(b) upon sensing selection of said interlock mode, disabling the machine unless a breath sobriety test is passed; and

(c) upon sensing selection of said bypass mode, permitting the machine to be operated regardless of whether a breath sobriety test is passed, provided that at least a predetermined period of time has elasped since said interlock mode was last selected.

4,697,667

DEBRIS EJECTOR FOR A SEISMIC VIBRATOR

Robert A. Kirby, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Dec. 16, 1985, Ser. No. 809,622
Int. Cl.[4] G01V *1/02*
U.S. Cl. 181—113 **2 Claims**

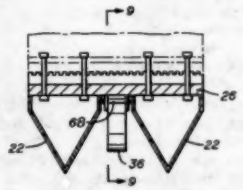
1. A seismic vibrator assembly comprising:

a baseplate;

a first cleat secured to said baseplate;

a second cleat secured to said baseplate, said first and second cleats adapted to penetrate the earth in response to said baseplate being placed upon the earth and being loaded; and

a leaf spring secured to said baseplate between said first and second cleats, said leaf spring having a compressed position in which said leaf spring is pressed against said baseplate and a relaxed position in which said leaf spring projects outward from said baseplate, whereby in response to lowering said baseplate to a ground engaging position said leaf spring is compressed against said baseplate and in response to raising said baseplate from said



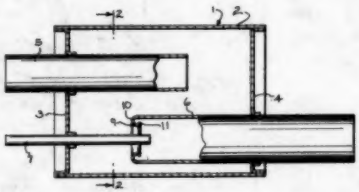
ground engaging position said leaf spring resumes its relaxed position, expelling any earth material from between said first and second cleats in so doing.

4,697,668

ASPIRATING MUFFLER

Irvy T. Barker, Stoughton, Wis., assignor to Nelson Industries Inc., Stoughton, Wis.

Filed Jan. 13, 1986, Ser. No. 818,782
Int. Cl.[4] F01N *1/14*
U.S. Cl. 181—262 **9 Claims**



1. In an exhaust system for an engine, a body having exhaust gas inlet means and outlet means, a tubular member mounted within said body and disposed to conduct exhaust gas, said tubular member having an integral inwardly rolled portion to provide said portion with a reduced cross sectional area, and an aspirating tube spaced concentrically within said rolled portion, and having an upstream end communicating with the exterior of said body, exhaust gas passing through said rolled portion creating an aspirating action to draw air through said aspirating tube.

4,697,669

FOLDING PORTABLE TREE STEP

Arvid H. Bergsten, Box 34, Anoka, Minn. 55303

Filed Jan. 16, 1987, Ser. No. 4,057
Int. Cl.[4] A63B *27/00, 29/04*
U.S. Cl. 182—92 **10 Claims**

1. A folding portable tree step having;

a. an elongate, channel-shape support leg;

b. a lag screw member pivotally and slidably mounted to an upper end portion of the support leg to have a working position extending outwardly from the support leg at about 90° from the longitudinal axis of the support leg; and

c. a channel-shape foot member pivotally mounted to a lower end portion of the support leg to have a working position extending outwardly from the support leg at about 90° from the axis of the support leg in an opposite direction from that of the lag screw member;

d. the foot member being pivotable from a folded position in parallel, nested relation between the channel legs of the support leg to an extended position parallel to its folded

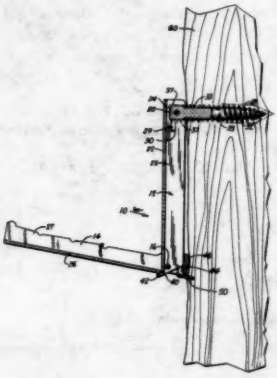
position but extending and pointing outwardly from the support leg;

the improvements wherein:

A. the foot member is pivotally mounted to the support leg in such a manner that the channel webs of each are in adjacent facing relation with the other and channels of both are open in the same direction when the foot member is in its folded position;

B. an upper end portion of the support leg is provided with a pair of mutually parallel cam-like guide slots each extending through one of its channel legs; and

C. the lag screw member is pivotally and slidably mounted to the support leg on a lag screw pivot pin which extends through the lag screw member and which extends through the cam-like guide slots in the channel legs of the support leg;



D. each guide slot has a lower end portion in close relation to the support leg channel web and an upper end portion spaced farther from said web, the relationship of the parts being such that:

(1) when the lag screw means is in its extended position and the lag screw pivot pin is in the lower end of the guide slots, the lag screw means is prevented by the support leg channel web from any pivotal movement out of said extended position, and

(2) when the lag screw pivot pin is in the upper end of the guide slots, the lag screw means is far enough from the support leg web that it is free to pivot between its extended position, its working position and its folded position.

4,697,670

WASTE OIL COLLECTION DEVICE

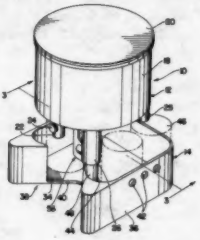
Michael Arruda, 79 Acushnet Rd., Mattapoisett, Mass. 02739

Filed Jan. 27, 1986, Ser. No. 823,189

Int. Cl.[4] **F16C** *3/14;* **F16N** *33/00, 31/00;* **B65B** *1/01*

U.S. Cl. 184—1.5 **8 Claims**

1. A waste oil collection device comprising a receptacle having a bottom wall, upstanding side walls and a top opening, said receptacle further including a detachable cover positioned over and adapted to close said top opening, said receptacle removably positioned on a support, said support having a generally planar base, upstanding side walls and an upstanding centrally positioned post, said receptacle bottom wall including a downwardly extending boss, said boss and said post positioned in slidable telescoping relationship with each other such that the receptacle may be vertically adjusted up and down relative to said support so as to position said receptacle top opening proximal to a drain opening of a vehicle, stop means for maintaining the position of said receptacle relative to said support, said stop means operatively associated with said support such that one hand of a user may simultaneously grasp said boss and manipulate said stop means so as to both position said receptacle on said support and to remove said receptacle



from said support, said support side walls including an inwardly extending recess terminating proximal to said post to facilitate easily reaching said boss by said user.

4,697,671

BRAKEPAD ASSEMBLY FOR DISC BRAKE

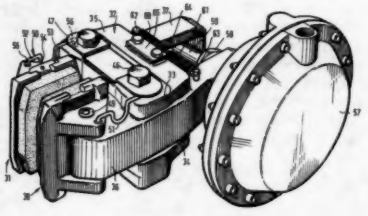
John Stewart, West Horsley, and George M. Brown, Twickenham, both of England, assignors to Twiflex Limited, Twickenham, England

Filed Apr. 9, 1986, Ser. No. 849,868

Claims priority, application United Kingdom, Apr. 12, 1985, 8509485; Apr. 12, 1985, 8509486; Apr. 12, 1985, 8509487

Int. Cl.[4] **F16D** *55/224, 69/04*

U.S. Cl. 188—72.9 **8 Claims**

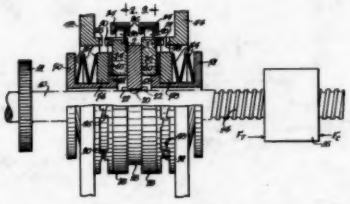


1. A brake pad assembly for use in a disc brake and comprising a holder, a brake pad releasably mounted in a recess in the holder so as to project therefrom, the recess having a shape complementary to that of the brake pad and having peripheral wall portions so located as to cooperate with edge surfaces of the brake pad along a major part of the brake pad periphery and restrain movement of the brake pad relative to the holder in two pairs of opposite directions which, when the assembly is in use, are perpendicular to the rotary axis of the disc, one pair of said directions being perpendicular to the other pair of said directions, a pair of oppositely positioned openings between the wall portions and a deformable member fixed to and inset in the surface of the brake pad which engaged the base of the recess so as to be flush with said surface, said member having end portions passing through the openings and bent over to engage the holder to secure the brake pad therein.

4,697,672
BI-DIRECTIONAL FORCE LIMITING NO-BACK MECHANISM

David J. Linton, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 25, 1985, Ser. No. 715,676
Int. Cl.[4] B60T 7/12
U.S. Cl. 188—134 8 Claims



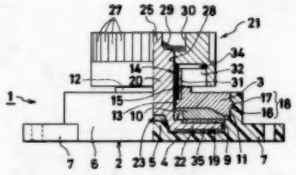
1. A force limiting no-back apparatus comprising:

a rotatable member operable by rotation thereof to drive a load, force limiting means associated with said rotatable member and operable in response to a predetermined axial movement of said rotatable member to preclude further rotation of said rotatable member, no-back means associated with said rotatable member to prevent rotation of the rotatable member by the load, a sensing plate on said rotatable member common to both said no-back means and said force limiting means, a portion of said no-back means coacting with said sensing plate and also comprising a protion of said force limiting means, and the no-back means allowing axial movement of the rotatable member necessary for operation of the force limiting means.

4,697,673
ONE-WAY DAMPER

Nobuaki Omata, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan

Continuation of Ser. No. 754,060, Jul. 12, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,220
Claims priority, application Japan, Jul. 16, 1984, 59-146070
Int. Cl.[4] F16D 57/02
U.S. Cl. 188—291 4 Claims

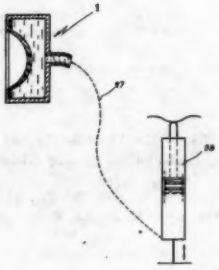


1. A one-way type of a damper comprising: a housing provided with a sleeve-like base element and a bottom wall said bottom wall having a centrally disposed frustoconical upward projection thereon and an upwardly facing surface outwardly of said projection; a rotor which has an axle and a braking disc at one end of said axle, the disc being contained in said housing together with a damping oil, the other end of the axle extending outward from said housing, and having a gear mounted thereon for rotation relative thereto, said axle at said one end having a recess receiving said projection for centralizing said axle, said one end of said axle having an annular portion below said disc and substantially engaging said upwardly facing surface, said axle having a boss extending above said disc; said housing including a cap with a central opening through which said axle extends, and a resilient diaphragm in said housing beneath said cap and substantially engaging said boss, said damping oil being disposed below said diaphragm on either side of said disc and in said recess; said gear having an axial bore therethrough and a counter-bore therein, and a coil spring into which said axle of said rotor is inserted, said spring fitting within said counter-bore and snugly embracing and engaging said axle, one end portion of said coil spring being fixed to said gear, the coil spring being reduced in diameter when said gear rotates in one direction and being expanded in diameter when said gear rotates in the other direction; whereby said gear transmits torque to said rotor through said coil spring when said gear rotates in said one direction but not when said gear rotates in said other direction.

4,697,674
OLEOELASTIC ENERGY ACCUMULATOR

Giorgio Tangorra, Monza, Italy, assignor to Industrie Pirelli S.p.A, Milan, Italy

Filed Jun. 17, 1985, Ser. No. 745,229
Claims priority, application Italy, Jun. 25, 1984, 21582 A/84
Int. Cl.[4] F16F 9/04, 9/08
U.S. Cl. 188—298 7 Claims



1. An oleoelastic energy accumulator for absorbing energy through compression of an elastomeric material, comprising;

a rigid casing delimited by borders,

at least one deformable elastomeric membrane having a central zone and a peripheral zone, said membrane being tightly sealed to said borders of the casing to delimit a closed space bounded by said casing and said membrane, said membrane having a convex configuration curved inwardly toward said closed space when in an at-rest position and a final flat configuration, said central zone and said peripheral zone having a thickness which is less than a thickness of a remaining portion of said membrane located between said central zone and said peripheral zone, said thickness of said remaining portion being between 0.3 and 0.6 times a distance between said central zone and said peripheral zone,

a liquid disposed in said closed space to act on one side only of said membrane,

means for limiting movement of said membrane, said membrane comprising means for enabling said membrane to pass from said convex configuration when at rest to said final flat configuration by means of a gradual compression over its entire extension with a resultant accumulation of elastic energy when subjected to pressure from said liquid, and to enable said elastic energy to be released when said pressure from said liquid is released.

4,697,675

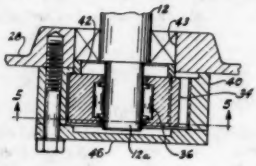
SHAFT ALIGNED BACKSTOP FOR A REDUCER

Harold R. Johnson, III, Aberdeen, Ohio; Allyn E. Phillips, Maysville, Ky.; Erwin R. Carrigan, Manchester, Ohio; Richard A. Virgo, Trumansburg, and James E. Mickelson, Newfield, both of N.Y., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Jun. 2, 1986, Ser. No. 869,794

Int. Cl.[4] F16D *59/00*; F16H *57/10*

U.S. Cl. 192—7 4 Claims



1. A backstop for a reducer having a casing, comprising a cylindrical, one-way clutch having a plurality of circularly arranged locking elements therein centered on its axis, a casing for said clutch fixed to said reducer casing, said clutch being loosely fitted in said clutch casing but being loosely keyed thereto so that said clutch has a limited free movement in said clutch casing both axially and radially, an axial bore through said clutch centrally of said circularly arranged locking elements, a reducer shaft extending through said bore and engaging said locking elements, and means for aligning and fixing said reducer shaft for rotation in said bore concentric with said circularly arranged locking elements.

4,697,676

SAFETY DEVICE FOR GARAGE DOORS AND THE LIKE

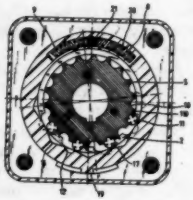
Werner Haake, Eschlohn 24, D-4286 Südlohn, Fed. Rep. of Germany

Filed Sep. 9, 1986, Ser. No. 905,677

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1985, 3532754

Int. Cl.[4] F16D *57/10*; E05D *17/00*

U.S. Cl. 192—8 R 16 Claims



1. A safety device for garage doors and the like, comprising a support; a rotary gear having alternating peripheral teeth and tooth spaces, said support having at least one recess adjacent a portion of said gear in the region of said teeth and tooth spaces; a displacing member movable relative to said support and having a portion adjacent a portion of the periphery of said gear; means for biasing said displacing member to at least one first position relative to said support; resilient means for urging said displacing member away from said first position to at least one second position against the opposition of said biasing means so that said displacing member leaves said first position and assumes said second position in response to a failure of said biasing means, said displacing member having a pocket provided in said portion thereof and a ramp adjacent said pocket and sloping toward the adjacent teeth and tooth spaces, said pocket being in register with said recess in the first position of said displacing member; and a blocking element received in said recess and in said pocket in the first position of said displacing member and being dimensioned to be bypassed by said teeth in the first position of the displacing member, said ramp being arranged to partially expel said blocking element from said recess and into an adjacent tooth space in response to movement of said displacing member to said second position so that the blocking element then prevents rotation of said gear relative to said support.

4,697,677

MOTOR VEHICLE CLUTCH FOR A MECHANICAL, MULTIPLE-SPEED AUTOMATIC TRANSMISSION

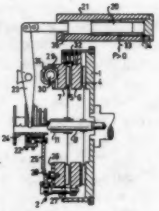
Grzegorz K. Janiszewski, Angered, Sweden, assignor to AB Volvo, Gothenburg, Sweden

Filed Jun. 12, 1985, Ser. No. 743,894

Claims priority, application Sweden, Jun. 21, 1984, 8403347

Int. Cl.[4] F16D *13/42, 21/06, 43/12*

U.S. Cl. 192—48.91 3 Claims



1. Motor vehicle clutch comprising a first clutch disc which is non-rotatably joined to an input shaft of a transmission, said disc being pressable against an engine flywheel by means of a first drive plate which is axially displaceable but non-rotatable relative to the flywheel; a second drive plate which is solidly joined to the flywheel; a second clutch disc which is arranged between the drive plates and is non-rotatably joined to a hollow shaft which is concentrically mounted on said input shaft; means by which the first drive plate can be alternatively pressed against either disc or set in an intermediate position in which both of the discs are not loaded by the first drive plates, and a centrifugal device which, when the first drive plate is set in said intermediate position, loads the first drive plate in a direction towards the second disc with a force dependent on engine speed.

4,697,678

CLUTCH COVER

Shozo Kuno, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Feb. 11, 1986, Ser. No. 828,268

Claims priority, application Japan, Feb. 13, 1985, 60-019832[U]

Int. Cl.[4] F16D *13/50*

U.S. Cl. 192—70.28 3 Claims

1. A clutch cover comprising:

a cover core having a wall portion inclusive of first and remaining second wall portions;

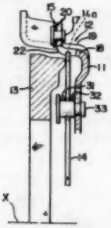
a pressure plate enclosed by the wall portion of said cover core and arranged in coaxial relation with said cover core;

a diaphragm spring arranged between said pressure plate and said cover core and in coaxial relation with said pressure plate for urging the same; and

a strap connecting an outer peripheral portion of said pressure plate to an outer peripheral portion of said cover core;

the first wall portion of said cover core being located at a periphery of the connection between said strap and said

cover core and disposed closer to a central axis of said pressure plate than the second wall portion, said first wall portion being provided with a cut-out at a location corresponding to an outer edge of said diaphragm spring;



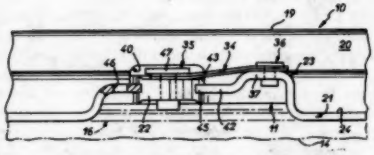
said cut-out of the first wall portion being located in a position closer to the central axis such that interference by the first wall portion with the outer edge of the diaphragm spring is prevented by the location of said cut-out.

4,697,679

CLUTCH COVER ASSEMBLY

Jacky Naudin, Asnieres, France, assignor to Valeo, Paris, France

Filed Apr. 3, 1985, Ser. No. 719,526
Claims priority, application France, Apr. 4, 1984, 84 05291
Int. Cl.[4] F16D *13/71*
U.S. Cl. 192—70.18 **19 Claims**



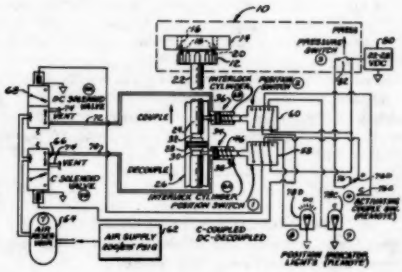
1. Clutch cover assembly suitable for automobile vehicles, comprising a generally annular cover adapted to be attached to a reaction plate, a generally annular pressure plate, rotational coupling means coupling said pressure plate to said cover for rotation while permitting axial movement of said pressure plate relative to said cover, axially acting elastic means bearing on said cover and urging said pressure plate away from said cover, and abutment means adapted to retain said pressure plate axially at a predetermined axial distance from said cover, said cover comprising a generally transverse front wall against which said axially acting elastic means bears, a generally axial side wall and a generally transverse radial rim at the end of said side wall axially remote from said front wall adapted to bear on the reaction plate, said pressure plate further comprising radially projecting lugs on its outside periphery, and said cover radial rim having a plurality of circumferentially spaced louvers offset axially relative to a main part of said radial rim, said louvers having respective fixing lands, said coupling means comprising elastically deformable straps attached at one end to one of said lugs of said pressure plate and, at an other end to a respective fixing land on a corresponding one of said louvers of said radial rim of said cover, said side wall of said cover having notches extending therethrough and locally interrupting respective louvers of said radial rim, said lugs on said pressure plate passing generally radially through said notches, each of said elastically deformable straps being disposed externally of said cover and on one side of said louvers axially facing said transverse front wall, and said louvers having circumferentially intermediate lands axially offset relative to respective fixing lands in the direction towards the main part of said radial rim and defining said abutment means.

4,697,680

FLUID OPERATED DISCONNECT COUPLING

Joseph Faber, Carmel, Ind., and Paul Myers, Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 5, 1986, Ser. No. 870,802
Int. Cl.[4] F16D *25/00*
U.S. Cl. 192—86 **8 Claims**



1. A fluid operated disconnect coupling comprising

first and second power train elements mounted for movement relative to each other between a coupled, power transmitting position and a decoupled, nontransmitting position;

means connected to at least one of said elements for effecting said relative movement between said positions and comprising a first fluid cylinder;

fluid operated latch means for latching said effecting means in at least one of said two positions including first and second mating latch parts, said second latch part being carried by said effecting means and said first latch part being movable for latchingly engaging or releasing said effecting means by latchingly engaging or releasing said second latch part, a second fluid cylinder for moving said first latch part and a valve operable with said first latch part to establish fluid communication between said fluid cylinders when said first latch part has released said effecting means; and

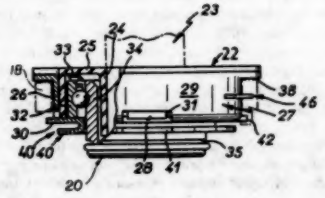
control means for selectively directing fluid under pressure to said second cylinder.

4,697,681

PULL-TYPE CLUTCH RELEASE BEARING ASSEMBLY

Christian Gay, Paris, and Philippe Lassiaz, Boulogne, both of France, assignors to Valeo, Paris, France

Filed Jun. 12, 1986, Ser. No. 873,878
Claims priority, application France, Jun. 12, 1985, 85 08893
Int. Cl.[4] F16D *23/14*
U.S. Cl. 192—98 **4 Claims**



1. Clutch release bearing assembly in which, for the purpose

of coupling the clutch release bearing to the clutch release device of a clutch, the release bearing comprises a drive element through which it applies traction to the clutch release device, an operating element through which it is operated on by a control member, a cover, a radial lip on said cover for applying said operating element axially to said drive element, a coupling part attached to said clutch release device, means for coupling together in traction said coupling part and said drive element, and means for limiting insertion of the drive element into the couplinclutch release device of a clutch, the release bearing comprises a drive element through which it applies traction to the clutch release device, an operating element through which it is operated on by a control member, a cover, a radial lip on said cover for applying said operating element axially to said drive element, a coupling part attached to said clutch release device, means for coupling together in traction said coupling part and said drive element, and means for limiting insertion of the drive element into the coupling part said limiting means being fastened to said operating element and consisting of angularly separated axial bearing lands adapted to serve as abutments facing said coupling part and openings alternating with said lands.

4,697,682

TORSIONAL DAMPER DEVICE

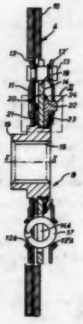
Jacques Alas, Esubonne, and Michel Graton, Paris, both of France, assignors to Valeo, Paris, France

Filed Dec. 2, 1985, Ser. No. 803,323

Claims priority, application France, Dec. 5, 1984, 84 18509

Int. Cl.[4] F16D *3/14*

U.S. Cl. 192—106.2 **23 Claims**



1. A torsional damper device comprising at least two coaxial parts disposed to rotate relative to each other within defined limits and damper means for opposing such relative rotation of said coaxial parts, each of said coaxial parts including a coaxial member, a friction assembly for producing frictional torque in the course of relative rotation of said coaxial parts, said friction assembly comprising a plurality of annular members including said coaxial members of said coaxial parts, an elastic prestressing member and a friction ring member, said elastic prestressing member and said friction ring member being disposed axially between said coaxial members, said friction ring member being coupled for rotation with one of said coaxial members over at least part of said defined limits of relative rotation, said elastic prestressing member applying an axial bias to said friction ring member, said elastic prestressing member and another adjacent one of said annular members of said friction assembly having cooperable means for selectively preloading said friction assembly, a plurality of circumferentially spaced primary lands on one of said elastic prestressing member and said another adjacent annular member of said friction assembly, and two relatively axially offset pluralities of circumferentially spaced secondary lands on the other of said elastic prestressing member and said another adjacent annular member of said friction assembly, said plurality of primary lands being cooperable with one of said pluralities of secondary lands for setting the preload of said friction assembly, and said elastic prestressing member and said another adjacent annular member being rotatable with the same coaxial member during relative rotation of said coaxial parts.

4,697,683

CLUTCH FRICTION DISK

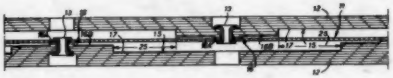
Michel Graton, Paris, France, and Roger F. Carmillet, Birmingham, Mich., assignors to Valeo, Paris, France

Filed May 30, 1985, Ser. No. 739,373

Claims priority, application France, May 30, 1984, 84 08526

Int. Cl.[4] F16D *13/69*

U.S. Cl. 192—107 C **22 Claims**



1. Clutch disk comprising an annular plane support member having at its outer periphery elastically deformable parts which are adapted to deform when the disk is subjected to axial compression and two friction facing members disposed one on each side of said support member and locally attached to said deformable parts whereby the thickness of the portion of the disk comprising said friction facing members is elastically compressible between an expanded inoperative configuration and a flattened operative configuration, wherein said deformable parts are substantially plane in said inoperative configuration, said friction facing members having on inside surfaces thereof stepped bosses circumferentially alternating with recesses and said friction facing members being locally attached to said deformable parts by said bosses, said bosses on each of said friction facing members being aligned with said recesses on the other of said friction facing members so that compressing the disk from its inoperative configuration into its operative configuration causes elastic deformation of said deformable parts by virtue of interpenetration of said bosses and said recesses in the axial direction, said bosses having a first axially innermost level and a second level axially set back from said first level, a first shoulder being defined between said first and second level of said bosses, a second shoulder being defined between said second level of said bosses and said recesses, said deformable parts being fixed to said first level of said bosses, said deformable parts being engageable with said second shoulders in the course of flattening of the friction disk, said deformable parts having successive stages of operation, including a first stage wherein said deformable parts are freely bendable on said first levels, and a second stage wherein said deformable parts engage said second shoulder for flexing said deformable parts between said second shoulders and increasing the stiffness of the deformable parts.

4,697,684

FRICTION CLUTCH DRIVEN PLATE

Ian C. Maycock, Leamington Spa, and Peter F. Crawford, Bubbenhall, both of England, assignors to Automotive Products plc, Leamington Spa, England

Filed Nov. 18, 1986, Ser. No. 932,008

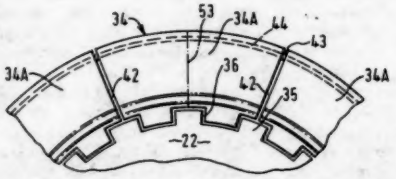
Claims priority, application United Kingdom, Dec. 5, 1985, 8530010

Int. Cl.[4] F16D *69/00, 13/52*

U.S. Cl. 192—107 R **10 Claims**

1. A friction clutch driven plate comprising a hub assembly provided with a carrier for a friction material arrangement, said carrier extending radially outwardly of the hub and being provided with outwardly extending teeth around its outer periphery, a friction material arrangement in annular dispo-

sition and having inwardly directed teeth engaging with the teeth of said carrier to provide drive between the carrier and the friction material arrangement, said friction material having two oppositely and axially facing friction faces which extend



substantially radially of said carrier, and said annular disposition comprising sections of the friction material arrangement disposed in succession in an annular array and capable of at least axial movement relative to one another.

4,697,685

CLUTCH COVER ASSEMBLY

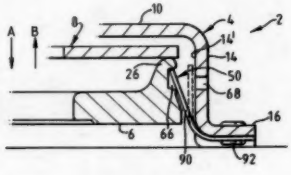
Roger N. Bancroft, Shutford, England, assignor to Automotive Products plc, Leamington Spa, England

Filed Jun. 9, 1986, Ser. No. 871,805

Claims priority, application United Kingdom, Jun. 12, 1985, 8514875

Int. Cl.[4] F16D *13/60*

U.S. Cl. 192—109 R **12 Claims**



1. A clutch cover assembly comprising a cover, a pressure plate axially moveable relatively to said cover, coupling means connecting said cover to said pressure plate which rotates with said cover, resilient means disposed between said cover and said pressure plate and acting axially of said cover whereby said pressure plate is urged in a first axial direction away from said cover towards a first position, the urging force applied to said pressure plate from said resilient means being relievable for allowing movement of said pressure plate in an opposite second axial direction into said cover towards a second position, latching means for making an engagement holding said pressure plate in a third position against the urging of said resilient means, said third position being intermediate said first and second positions, and said latching means being resiliently biased for automatic disengagement in response to a relative axial movement between said cover and said pressure plate having the resultant effect of a movement of said pressure plate in said second direction from said third position towards said second position and for allowing subsequent movement of said pressure plate to and fro in said first and second directions.

4,697,686

GATE FOR SPLITTING A FLOW OF GRANULAR MATERIAL

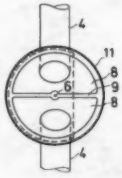
Henrik West, Copenhagen, Denmark, assignor to F. L. Smidth & Co. A/S, Denmark

Filed Aug. 9, 1984, Ser. No. 639,681

Claims priority, application United Kingdom, Aug. 12, 1983, 8321732

Int. Cl.[4] B65G *11/00, 11/20*

U.S. Cl. 193—23 **7 Claims**



1. In a splitting gate for dividing in an adjustable manner a flow of granular material into at least two material flows, said gate comprising an inlet pipe and two or more outlet pipes, said outlet pipes each leading downwards from a respective opening in a substantially horizontal and substantially circular surface, and adjacent ones of said openings being separated by a respective strip in said surface; and an intermediate piece, between said inlet pipe and said surface, forming a closed passage which is coupled at one end of said inlet pipe, and which, at the other end, discharges over at least part of one or more of said openings in said circular surface, the improvement wherein the axis of said inlet pipe is in a vertical plane intersecting said circular surface along a diameter, and wherein there is a substantially plane baffle plate in said intermediate piece, said plate being pivotal about a vertical axis and the plane of said plate intersecting said surface along a chord and being inclined to said axis of said inlet pipe so that material discharged from said inlet pipe impinges on said plate, said plate during continuous operation thereby directing said flow of granular material such that it is divided into at least two material flows.

4,697,687

COIN ACTUATED APPLIANCE WITH COIN COLLECTING APPARATUS

James D. Wilson, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa

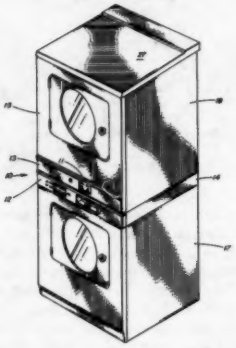
Filed Jan. 15, 1986, Ser. No. 819,206

Int. Cl.[4] G07F *17/20*

U.S. Cl. 194—344 **4 Claims**

1. A coin actuated stacked appliance including first and second stacked laundry machines having first and second enclosing cabinets, the combination comprising: support means between said first and second cabinets including generally upstanding peripheral wall means cooperable with said first and second cabinets for supporting said second laundry machine in an operative posture above said first laundry machine, said support means defining a compartment between said first and second laundry machines; a single coin accepting means disposed at least partially within said second cabinet and operable for receiving coins to initiate actuation of said first and second laundry machines; housing means defining a vertically shallow and horizontally enlarged substantially closed vault including a generally rectangular structure extending horizontally lengthwise into said compartment, a portion of said housing means extending through an aperture in said peripheral wall means and defining an access opening for providing access to said vault; coin collecting means including a vertically shallow and horizontally enlarged box-like structure proportioned to extend lengthwise within said vault, said box-like structure having laterally sloping bottom wall means generally

aligned with said coin accepting means for laterally urging coins to one side of said box-like structure, said coin collecting means operable for movement into and out of said vault through said access opening, said box-like structure defining an open portion for receiving coins and a coin storage area rearwardly and laterally displaced from said coin accepting means; and coin diverting chute means mounted within said vault and including a rearwardly directed exit end disposed at least partially in said box-like structure, said coin diverting chute means operable for receiving coins from said coin accepting



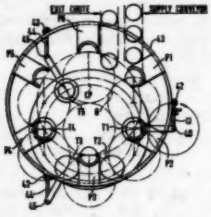
means and for directing coins from a first generally vertical direction of travel at the egress of said coin accepting means to a second generally horizontal and rearward direction of travel at said exit end of said coin diverting chute means onto said sloping bottom wall means within said coin collecting means, said coin diverting chute means and said sloping bottom wall means of said box-like structure being cooperable to rearwardly direct and laterally urge said coins within said coin collecting means for effecting the deposit of said coins in said coin storage area.

4,697,688

TRANSFER MECHANISMS FOR CIRCULAR TRANSFER PRESS

John Kimbell, Gellingen, and Werner Uehlinger, Arlesheim, both of Switzerland, assignors to KM-Engineering AG, Basel, Switzerland

Continuation of Ser. No. 298,824, Sep. 2, 1981, Pat. No. 4,471,644. This application Sep. 6, 1984, Ser. No. 647,936
The portion of the term of this patent subsequent to Sep. 18, 2001, has been disclaimed.
Int. Cl.[4] B65G *47/00*
U.S. Cl. 198—339.1 **8 Claims**



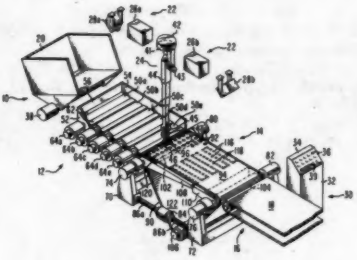
1. A transfer mechanism and a circular transfer press combination, comprising a plurality of tools for performing operations on components, said tools being arranged within a tool circle means of said press, said transfer mechanism being one of disposed outside and inside of the tool circle, said transfer mechanism having means for transferring the components between a plurality of stations arranged at equal angles within a first substantially circular arrangement, said means for transferring the components having at least one carrier member, a plurality of pocket members being arranged at equal angles within a second substantially circular arrangement and carried by said carrier member, each said pocket member being adapted for receiving and transporting of at least one said component between at least two said stations, drive means being connected to said carrier member for moving said carrier member in a such way that a center of each said pocket member being moved along a curved path different than said first substantially circular arrangement going through said two consecutive stations, said drive means conveying to said carrier member a uniform, unidirectional rotary motion, tool actuating means being provided within the press for operating said tools consecutively one after another, said tool actuating means supplying power to operate one of said tools.

4,697,689

ARTICLE MANIPULATION SYSTEM

Ross M. Carrell, Burlington County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Dec. 26, 1985, Ser. No. 813,422
Int. Cl.[4] B65G *47/24*
U.S. Cl. 198—394 **15 Claims**



1. An apparatus for overturning generally flat articles, said apparatus comprising:

a flexible, endless conveyor belt;

first and second means for producing longitudinal motion of said conveyor belt, each of said first and second means having a longitudinal axis;

means positioned under said conveyor belt intermediate said first and second belt motion producing means for supporting said belt in a substantially horizontal plane and comprising a pair of interdigitated support members pivoted about said axes, respectively;

first and second drive means coupled, respectively, to said first and second belt motion producing means;

means for displacing said supporting means and said first and second belt motion producing means such that said conveyor belt forms a downward loop between said first and second belt motion producing means under the weight of an article thereon, said means for displacing said supporting means providing rotational motion to said supporting means; and

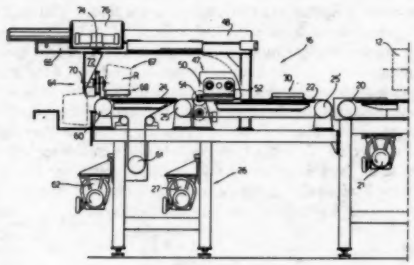
means for controlling said first and second drive means such that the rotational velocity and direction of each of said belt motion producing means is individually selectable, said controlling means producing motion of said belt in said downward loop such that said article thereon may be overturned.

4,697,690

SYSTEM AND A PROCESS FOR ORIENTING AS REQUIRED BORED FRUSTO-CONICAL AND/OR CYLINDRICAL BODIES, USUALLY YARN REELS OR CONES FED IN BULK

Federico Minnetti, Pistoia, Italy, assignor to Officine Minnetti di Federico Minnetti & C.S.a.s., Pistoia, Italy

Filed Jun. 4, 1985, Ser. No. 741,189
Claims priority, application Italy, Jun. 4, 1984, 21237 A/84
Int. Cl.[4] B65G *43/08*
U.S. Cl. 198—395 8 Claims



1. A process for orienting in a determined attitude frusto-conical yarn reels with a through hole, said reels being bulk fed in a random attitude, comprising the following steps:

(a) arranging said reels on a path with their axes disposed in one of a vertical position and a position in which the frusto-conical surface of the reel presents at least one generatrix disposed on the surface of the path;

(b) detecting the existence of a through hole in a predetermined position in said reels;

(c) as a function of said detection, selectively turning over said reels, so that a generatrix of the frusto-conical surface is lying on the surface of the path;

(d) detecting the positions relative to one another of the reels' larger and smaller ends;

(e) as a function of said position detecting step, turning the reels end for end so that a required end is in a required position.

4,697,691

APPARATUS FOR TRANSFERRING ARTICLES, ESPECIALLY BOTTLES

Rudolf Zodrow, and Rainer Buchholz, both of Düsseldorf, Fed. Rep. of Germany, assignors to Jagenberg Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Feb. 10, 1986, Ser. No. 828,042
Claims priority, application Fed. Rep. of Germany, Feb. 11, 1985, 3504555
Int. Cl.[4] B65G *47/26*
U.S. Cl. 198—425 9 Claims

1. In combination with a continuously operating single-line conveyor and with a continuously operating multiline conveyor, an apparatus for transferring upright articles between the single-line conveyor and the multiline conveyor, the apparatus comprising:

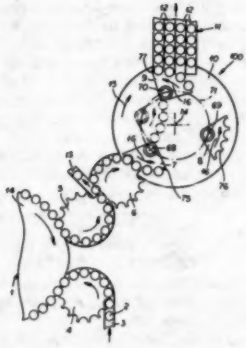
a carrier rotatable about a carrier axis and oriented with the single-line conveyor extending generally tangentially from it and with the multiline conveyor extending generally radially from it, whereby the articles move substantially only tangentially as they pass between the single-line conveyor and the carrier and substantially only radially as they pass between the multiline conveyor and the carrier;

means for continuously rotating the carrier about its axis at a substantially constant speed;

at least one transfer segment pivotal on the carrier about a segment axis radially offset from and generally parallel to the carrier axis and having an outer edge directed radially away from its axis and formed with a plurality of article-receiving pockets all opening generally radially from the segment axis and of a number and spacing corresponding to the lines of the multiline conveyor, the transfer segment being pivotal about the transfer axis into and out of a transfer position with its pockets opening radially outward of the carrier axis;

means for retaining the upright articles in the pockets; and

drive means connected to the segment for pivoting same angularly of its axis at least once during each revolution of the carrier such that as the segment passes the single-line conveyor the pockets move through the transfer position at a speed equal to the tangential travel speed of the articles in the single-line conveyor and such that as the segment passes the multiline conveyor the pockets move through the transfer position at a speed substantially identical to the peripheral speed of the carrier but in an opposite direction such that movement of the articles around the carrier axis substantially stops in the transfer position at the multiline conveyor.

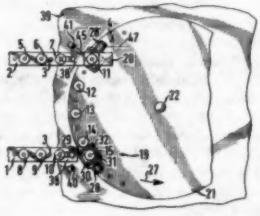


4,697,692

DEVICE FOR ADVANCING COPS TO A CYCLICALLY STEPWISE ADVANCING COP CONVEYOR

Wilhelm Küpper, Wegberg, and Helmuth Hensen, Mönchengladbach, both of Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Mönchengladbach, Fed. Rep. of Germany

Filed Dec. 4, 1985, Ser. No. 805,330
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1984, 3444625
Int. Cl.[4] B65G *37/00*
U.S. Cl. 198—464.3 4 Claims



1. Device for individually and successiveiy advancing cops from a cop-producing machine in an orderly manner via two conveyor belts to a cyclically stepwise advanceable cop conveyor having take-up mandrels thereon, comprising respective substantially vertical loading shafts located between the respective conveyor belts and the cop conveyor for delivering

cops in upright position onto the take-up mandrels of the cop conveyor, each of said loading shafts being formed of sidewise deflectable wall elements, an actuating device operatively engageable with said loading shafts, respectively, for deflecting said wall elements thereof sidewise so as to permit the respective delivered cop to be further advanced by the cop conveyor, first and second clock switching means connected to the respective conveyor belts for actuating the belts to individually and successively advance the cops in the orderly manner, sensor means for distinguishing between the absence and presence of a cop on a respective take-up mandrel of the cop conveyor and for enabling and disenabling said first and second clock switching means accordingly, and third clock switching means connected to the cop conveyor, said sensor means being operative for distinguishing between absence and presence of a cop on a respective take-up mandrel located directly beneath the respective loading shaft and for enabling said third clock switching means to advance stepwise, during each switching cycle, a distance corresponding to double the mean spacing between two mutually adjacent take-up mandrels of the cop conveyor, when the presence of a cop on each of the respective take-up mandrels beneath both of said loading shafts is distinguished.

4,697,693

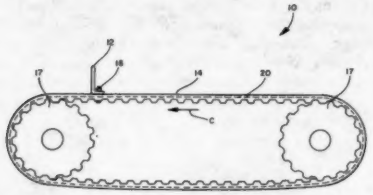
CONVEYING SYSTEMS

Gregory J. Rajala, Winnebago County, and Robert J. Shavlik, Brown County, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 603,002, Apr. 23, 1984, abandoned. This application Nov. 10, 1986, Ser. No. 928,737

Int. Cl.[4] B65G *15/44*

U.S. Cl. 198—699 **7 Claims**



1. An endless synchronous belt system comprising:

A. at least one drive-toothed pulley having teeth of a chosen dedendum;

B. at least one driven pulley spaced a chosen distance and in line from said drive pulley having teeth with dedendum corresponding with the dedendum of said drive pulley;

C. at least one endless synchronous belt of a resilient composition intermeshingly coupled between said drive and driven pulleys, said belt having teeth of a particular configuration, said belt comprising: (1) a backing; (2) a plurality of tension members extending the full length of and in line with the pitch line of said belt; (3) a plurality of standard profile teeth spaced at specific locations along the length of the belt, said standard profile teeth having an addendum equal in length to the dedendum of said pulley teeth; (4) at least one modified profile tooth interspaced with said standard profile teeth, the addendum of said modified tooth being of a chosen reduced size with respect to the addendum of said standard profile teeth, said modified teeth having an aperture extending therethrough from said backing of said belt to a top land of said tooth forming a mounting strut on said belt; and (5) at least one transporting device for storing articles, said transporting device having a mounting base having at least one aperture for attachment to said belt; and

D. at least one attachment assembly for attaching said transporting device to said modified tooth, said assembly comprising: (1) a tip plate having at least one aperture located in line with the aperture of said modified teeth; (2) a non-standard bolt for axially routing through the apertures in said tip plate, said modified tooth and said base of said transporting device to bolt said transporting device to said belt, said bolt comprising: (a) a flat-head; (b) a smooth cylindrical top shank having one end depending from said flat-head; (c) a standard-thread lower shank having a diameter smaller than said top shank depending from a central region of another end of said top shoulder shank forming a circular shoulder at the interface, said shoulder providing a load-bearing surface for the base of said transporting device when the transporting device is compressed against the belt; and (3) a standard-thread locknut which threads upon the lower shank of said bolt for locking the transporting device to the backing of said belt;

wherein when said locknut is tightened the base of the transporting device compresses the backing of said belt a controlled amount against the shoulder of said bolt and wherein the location of said shoulder of said bolt relative to the location of the top surface of the backing of the belt precludes distorting the profile of the belt whereby said modified tooth with said attachment assembly disposed thereon intermeshes with the pulley teeth without any substantial interference.

4,697,694

ROLLER DRIVE UNIT

Thomas Huber, Iffeldorf, Fed. Rep. of Germany, assignor to Electro-Pneumatic-International GmbH, Hausham, Fed. Rep. of Germany

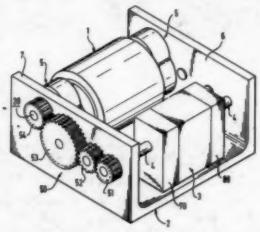
PCT No. PCT/DE84/00149, § 371 Date Mar. 20, 1985, § 102(e) Date Mar. 20, 1985, PCT Pub. No. WO85/00577, PCT Pub. Date Feb. 14, 1985

PCT Filed Jul. 16, 1984, Ser. No. 717,273

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1983, 3326355

Int. Cl.[4] B65G *13/02*

U.S. Cl. 198—782 **41 Claims**



1. A roller drive unit for the drive of articles (**100**) movable on a conveyor track and comprising:

at least one drive roller (**1**; **1**, **1'**) carried by a drive shaft (**10**);

a motor (**3**; **403**);

at least one gear arrangement (**50**, **60**, **61**; **460** to **463**);

guide equipment (**40**; **440**, **440'**);

and control equipment;

said drive roller (**1**; **1**, **1'**) being rotationally drivable by said motor (**3**; **403**) through said gear arrangement (**50**, **60**, **61**; **460** to **463**) which transmits driving torque from said motor to said drive roller;

said drive shaft (**10**) being rotationally mounted in said guide equipment (**40**; **440**, **440'**) such that said drive roller (**1**; **1**, **1'**) is pivotable with respect to a base on a circularly arcuate movement path;

said drive roller (**1**; **1**, **1'**) being movable by means of said control equipment (**40**; **440**, **440'**) along said circularly arcuate movement path between a lower rest position and an upper drive position in which latter position said drive

roller (1; 1, 1') stands in engagement with the underside of said article (100) to be driven;

wherein said control equipment comprises a clutch device (30; 430) designed for the transmission of a torque between said gear arrangement (50, 60, 61; 460 to 463) in such a manner that the value of said transmitted torque can be greater than the driving torque required for the raising of the drive roller (1; 1, 1') into said upper drive position;

wherein said gear arrangement (50, 60, 61, 460 to 463) includes a first gear wheel (60; 460), which is borne on a shaft (20; 420) and is driven by the motor (3; 403), and a second gear wheel (61; 461) which is driven in the opposite sense by said first gear wheel and is mounted secure against rotation to said drive shaft (10) of said drive roller (1; 1, 1'); characterized in that

said shaft (20; 420) of said first gear wheel (60; 460) is rotatably borne in fixed location relative to said base; and on that

said circularly arcuate movement path of said drive roller (1; 1, 1'), which path is defined by said guide equipment (40; 440, 440'), is defined to be arranged concentrically with the rotational axis of said shaft (20; 420) of said first gear wheel.

4,697,695

CONVEYOR FOR CONTAINERS

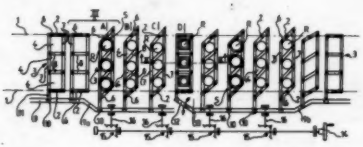
Didier V. Lemaire, Vernouillet, and Jean-Marc Dronet, Putanges Pont Ecrepin, both of France, assignors to E.P. Remy & Cie, France

Filed Feb. 3, 1986, Ser. No. 825,630

Claims priority, application France, Oct. 28, 1985, 85 15997; Dec. 17, 1985, 85 18713

Int. Cl.⁴ B65G *29/00*

U.S. Cl. 198—803.15 **13 Claims**



1. A conveyor for containers such as cups, comprising:

two endless chains provided with transverse members connected to both chains and adapted to receive and carry the containers;

said members each comprising at least four hinged links hingedly connected to one another to constitute at least one deformable parallelogram linkage including

two first opposite links (6) hingedly connected to the two chains respectively, and

two second oppsite links (7) hingedly connected to said two first opposite links respectively; and

means for moving said two first and two second opposite links relative to each other so as to accommodate the containers therebetween.

4,697,696

PLATE BELT CONVEYOR

Michael Howe, Wesel-Bislich, and Waldemar Schwarz, Kamp-Lintfort, both of Fed. Rep. of Germany, assignors to Aumund-Fordererbau GmbH Maschinenfabrik, Rheinberg, Fed. Rep. of Germany

Filed Sep. 23, 1985, Ser. No. 779,340

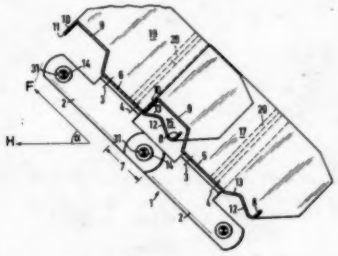
Claims priority, application Fed. Rep. of Germany, Oct. 18, 1985, 3438231

Int. Cl.⁴ B65G *17/10*

U.S. Cl. 198—822 **6 Claims**

1. Plate belt conveyor for steep conveying comprising:

mutually overlapping plates being disposed on flat link chains and having a pitch which equals the spacing between successive chain links, each of said plates in the regions where they overlap being provided at their transverse edges at one end with an upward directed leg and at the other end with a roof-like arch from which a steeply downward directed leg extends, each said roof-like arch spanning the upward directed leg of the corresponding overlapped plate, each said downward directed leg together with said roof-like arch and said upward directed leg of the corresponding overlapped plate forming a pocket which opens when the conveyor belt reverses its direction of travel by passing around an end sprocket, each said lower end of the downward directed leg of the upper overlapping plate lying in a sealing manner on the corresponding lower overlapping plate when the upper and lower overlapping plates are arranged parallel to one another, each said lower end of the downward directed



leg maintaining at most a slight spacing with the corresponding lower overlapping plate, each said lower overlapping plate at its one end having an upward arched bulging beginning directly behind a point where the lower end of the downward directed leg of the corresponding upper overlapping plate lies on the lower overlapping plate, the arched bulging being curved arcuately in cross-section wherein on mutual pivoting of said plates when the conveyor belt passes around the end sprocket, the sealing between the arched bulging and the lower end of the corresponding downward directed leg is maintained as the lower end of the downward directed leg pivots about the corresponding arched bulging, the pocket opening only after the lower end of the downward directed leg of the upper overlapping plate, passes an apex of the corresponding arched bulging.

4,697,697

METHOD AND APPARATUS FOR PACKAGING AN INTRAOCULAR LENS

William M. Graham, Burton; Wade C. Vaughn, Seattle, and Charles M. Inman, Issaquah, all of Wash., assignors to CooperVision, Inc., Palo Alto, Calif.

Filed Aug. 18, 1986, Ser. No. 897,313

Int. Cl.⁴ B65D *81/22*; A61F *1/16*

U.S. Cl. 206—5.1 **14 Claims**

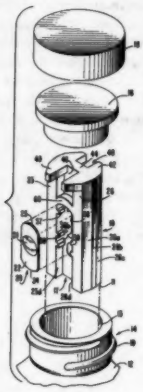
1. A retainer for an intraocular lens having an optic and a haptic which is defined by a pair of elongated sides, said retainer being structurally adapted for retaining said lens on said retainer for insertion into a vial, said retainer comprising:

a pair of spaced, elongated side walls defining a lens receiving area between said side walls;

a transversely-extending wall portion connecting said side walls to define an interrupted supporting surface for supporting a haptic surface along each edge of said haptic, said interrupted supporting surface lying intermediate a thickness of said elongated sidewalls;

a plurality of ribs located on inner walls of said elongated side walls and extending inwardly toward an elongated axis of said retainer a limited predetermined distance, each

of said ribs defining at an end surface thereof a slot formed by the end surface of said rib and a portion of said support-



ing surface of said transversely-extending wall portion, said slot having a dimension sized to receive the elongated edges of said haptic.

4,697,698

CREDIT AND IDENTIFICATION CARD HOLDER

Franz Holdener, Neuseewen, CH-8843 Oberiberg, Switzerland

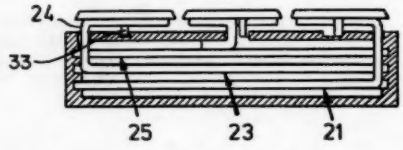
PCT No. PCT/CH85/00028, § 371 Date Nov. 13, 1985, § 102(e) Date Nov. 13, 1985, PCT Pub. No. WO85/04313, PCT Pub. Date Oct. 10, 1985

PCT Filed Feb. 15, 1985, Ser. No. 804,659

Claims priority, application Switzerland, Mar. 28, 1984, 1556/84

Int. Cl.[4] **A45C** *11/00*

U.S. Cl. 206—39.4 **8 Claims**



1. A holder for a plurality of credit or identification cards comprising a rectangular case (10) enclosing an interior space and having an opening (12) to said interior space along at least one end, said case (10) comprising a front and a back face connected by two longitudinal side walls adjacent said opening and a rear wall (11) opposite said opening (12), wherein said longitudinal side walls are provided with a plurality of grooves (13) retaining a plurality of slides (21, 23, 25) arranged substantially parallel to one another and to said front and back faces in said interior space, each said slide is dimensioned to accommodate a credit or identification card (K), and each said slide is freely slidable in said grooves (13); the ends of said slides near said opening are provided with a front stop (29) and the ends of said slides near said end wall are provided with rear stops (29') for retaining said cards (K) on said slides; each slide is provided with a tab (22, 24, 27) extending at substantially right angles to said slide for a distance and merging into a tab portion oriented substantially parallel to said slide, said tab portion connected to a pad (30) on the exterior of said case (10) by means of pin (31); at least one said face of said case (10) is provided with a plurality of slots (14) corresponding to said pins (31), whereby each slide is individually movable from said interior space to protrude out of said opening (12) by lateral displacement of each said pad (30), and said case (10) is provided with a plurality of lateral cutouts (16) near said rear wall (11) and each said pad is provided with a latch pin (33) engageable in one of said lateral cutouts (16) to retain said slides (21, 23, 25) in said interior space and to prevent accidental displacement of each said slide.

4,697,699

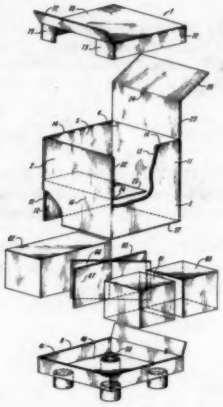
SHIPPING CONTAINER

Wesley C. Schneider, Chicago, Ill., assignor to Tootsie Roll Industries, Inc., Chicago, Ill.

Filed Nov. 6, 1985, Ser. No. 795,512

Int. Cl.[4] **B65D** *77/24, 90/04*

U.S. Cl. 206—44.11 **3 Claims**



1. A container for shipping of items and for display of items within the container at a convenient level for retail sale comprising:

a rectangular box of sheet material defining a sleeve having an open upper end, an open lower end and four sidewalls;

a cover fitting over said open upper end for use during shipping;

a bottom comprising a bottom sheet with a peripheral upwardly extending lip in facing relation to and enclosing said four sidewalls, and legs for raising the level of said container;

means separating the sleeve into an upper section for shipping of cartons and for display of items at a convenient level for retail sale, and a lower section for shipping of cartons, said separating means comprising rigid sheet portions integrally formed with and extending from the upper ends of opposite sidewalls, said rigid sheet portions extending from the upper end of opposite sidewalls, said rigid sheet portions extending downwardly within said sleeve, the lower part of said rigid sheet portions having integral flaps extending from the opposite sidewalls across said sleeve to define said upper and lower sections; and

bracing means for supporting said flaps and for dividing said lower section into subsections for receiving cartons.

4,697,700

PROTECTIVE DEVICE FOR DENTAL MODELS

Bernard Weissman, 225 E. 48th St., New York, N.Y. 10019

Filed Aug. 15, 1985, Ser. No. 765,673

Int. Cl.[4] **A60C** *19/10*

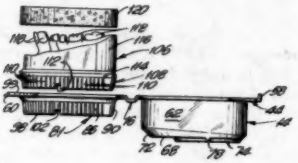
U.S. Cl. 206—83 **3 Claims**

1. In a protective carrier for holding and protecting a dental

model used in producing a dental prosthesis, said carrier being an integral one-piece construction of plastic material and consisting of a tray portion, a cover portion, a hinged portion connecting said tray portion to said cover portion and latch means for securing said tray portion and said cover portion together said tray portion having a cavity chamber for receiving a correspondingly shaped pedestal portion of the dental model, said cover portion having a recessed chamber for covering an upper part of the dental model, said recessed chamber and said cavity chamber providing a closed compartment for securely retaining the dental model during transport and storage thereof, said tray portion having a substantially U-shaped planar configuration with said cavity chamber having a U-shaped base wall and upstanding U-shaped facing outer and inner cavity walls interconnected by rounded end walls, an improvement comprising:

keyed means provided in said cavity chamber of said tray portion for matingly engaging keyed portions provided on the pedestal portion of the dental model, said keyed means including:

continuous teeth disposed on said facing outer and inner cavity walls, said teeth extending into said cavity chamber to mate with teeth provided on the pedestal portion of the dental model;



said teeth on said inner cavity wall having a greater height from said base wall than said teeth on said outer cavity wall to provide a U-shaped recessed seat about an upper portion of said outer cavity wall to receive a peripheral flange of the pedestal portion of the dental model;

a U-shaped rib projecting from said base wall into said cavity chamber to be received in a U-shaped slot provided in a bottom part of the pedestal portion of the dental model, said rib extending from one rounded end wall of the cavity chamber to the other rounded end wall; and

web means extending upwardly from said base wall and laterally from said outer cavity wall to said rib and then to said inner cavity wall for supporting said rib and for being received in mating web slots provided in the bottom part of the pedestal portion of the dental model;

a resilient pad for positioning within said recessed chamber to retain the dental model securely in place within said closed compartment; and

retaining post means projecting into said recessed chamber for pressing onto the upper part of the dental model to hold the dental model in place, said resilient pad including an aperture for receiving said retaining post means therethrough.

4,697,701

DUST FREE STORAGE CONTAINER FOR A MEMBRANE ASSEMBLY SUCH AS A PELLICLE AND ITS METHOD OF USE

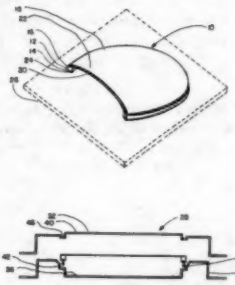
Minghaw Ying, Los Altos, Calif., assignor to Inko Industrial Corporation, Sunnyvale, Calif.

Filed May 30, 1986, Ser. No. 868,838

Int. Cl.[4] B65D *85/38*

U.S. Cl. 206—316 **15 Claims**

1. An optical membrane assembly package, comprising: an optical membrane assembly including a circumferential frame having a front side and a back side and an optical membrane mounted to and extending across the entire extent of said frame; a container for storing said optical membrane assembly until the latter is placed into use, said container including a base member defining an upwardly facing circumferential shoulder supporting the front side of said circumferential frame along its entire extent such that the front or critical face of said optical membrane is maintained in spatial relationship with the rest of said base member, said container also including a cover disposed over said base member and the entire optical membrane assembly, and seal means disposed between and extending



along the entire extent of the front side of said circumferential frame and said shoulder whereby to serve as a seal between the frame's front side and said shoulder in order to seal closed the front face of said optical membrane within said base member said sealing means being in the form of a continuous strip of adhesive which also serves to bond the optical membrane assembly to another surface such as a photomask when the assembly is placed in use.

4,697,702

MAGNETIC TAPE CASSETTE WITH TAPE PROTECTIVE SLIDING CLOSURE AND LOCK MECHANISM FOR SLIDING CLOSURE

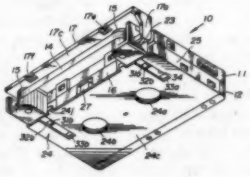
Kiyoshi Urayama, Miyagi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 6, 1986, Ser. No. 836,715

Claims priority, application Japan, Mar. 22, 1985, 60-41310[U]

Int. Cl.[4] B65D *85/672*

U.S. Cl. 206—387 **16 Claims**



1. A magnetic tape cassette comprising:

a cassette casing having a mouth through which a magnetic tape is accessible, said mouth including a first opening in a front end face of said casing and a second opening in a lower section of the casing adjacent said front end face;

a pivotal closure lid covering and exposing said first opening of said mouth;

a sliding closure member slidable with respect to the lower section of said cassette casing and adapted to cover and expose said second opening of said mouth, said closure member being movable between a first position in which it covers said second opening and a second position in which it exposes said second opening; and

first and second resilient locking means provided with said cassette casing, each of said locking means having a resil-

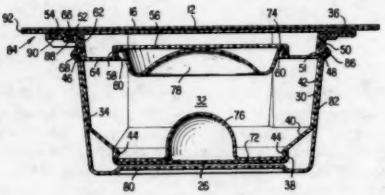
iently deformable lever with a locking head, said first locking means being located adjacent a longitudinal front end and adjacent one of the lateral sides of said magnetic tape cassette, and said second locking means being located adjacent the front end and adjacent the other lateral side of said magnetic tape cassette, said locking lever being associated with said sliding closure member for normally holding said closure member in said first position while said cassette is not in use, and allowing said closure member to move to said second position when said cassette is inserted into an associated recording and/or reproducing apparatus.

4,697,703

JOINT PROSTHESIS PACKAGE

Malcolm Will, 120 Francis St., Keyport, N.J. 07735

Filed Jul. 2, 1986, Ser. No. 881,276
Int. Cl.[4] A61B *17/06*
U.S. Cl. 206—438 **16 Claims**



1. A package for holding a medical item such as a prosthesis part comprising:

a container having a bottom and side walls, each side wall having first, inwardly projecting lugs closely spaced from said bottom wall and second, outwardly projecting lugs and complementary recesses adjacent the upper end thereof;

a lid for said container, said lid having outer side walls closely receivable within said side walls of said container and including outwardly projecting lugs adapted to mate with said recesses, inner side walls spaced from said outer side walls, a top wall, and inwardly projecting lugs on said inner side walls closely adjacent said top wall;

a first insert having a planar base portion of substantially the same configuration as said container bottom wall and an upwardly projecting central portion, said insert being adapted to be retained in said container between said bottom wall and said first lugs thereof; and

a second insert having a planar base portion of substantially the same configuration as said top wall of said lid and a downwardly projecting central portion, said second insert being adapted to be retained in said lid between said top wall and said inwardly projecting lugs thereof;

the arrangement being such that said projections of said first and second inserts, when said inserts are retained in said container and said lid, respectively, and said lid is positioned on said container, engage opposite sides of the item and retain the same in position.

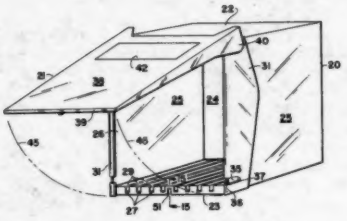
4,697,704

STORAGE CONTAINER FOR FLOPPY DISCS

Martin W. Curry, Jacksonville, Fla., assignor to Royal Master Systems, Inc., Jacksonville, Fla.

Filed Jun. 30, 1986, Ser. No. 880,040
Int. Cl.[4] B65D *85/30*
U.S. Cl. 206—444 **15 Claims**

1. A container for storing a plurality of computer software discs standing on edge in spaced parallel arrangement, comprising a generally cubical rigid container body having an upper horizontal wall, a lower horizontal wall, a rear vertical wall, two vertical side walls, and a vertical open front, a first plurality of spaced grooves parallel to said side walls along said bottom wall having their open sides facing upwardly and extending from adjacent said rear wall to said open front, a second plurality of spaced grooves parallel to said side walls along said upper wall having their open sides facing downwardly and extending from adjacent said rear wall to said open front and being in general vertical alignment with said first plurality of spaced grooves respectively, said grooves being slightly larger in width than the thickness of said discs, a shaft seat strip on the outside of each said side wall adjacent said open front and extending from said upper wall to said lower wall, each strip having an upper groove with an open end



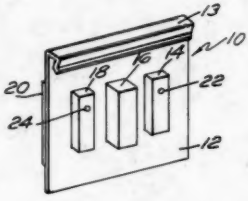
adjacent the juncture of said open front and said upper wall and a closed end downwardly from said open end and a lower groove with an open end at said open front adjacent said lower wall and a closed end rearwardly from said open end, and a removably attachable pivotable cover having a front surface and a back surface and adaptable to fit snugly against and be coextensive with said open front, said cover having two sidearms extending rearwardly at substantially right angles from said back surface each said sidearm having a short stub cylindrical shaft directed toward and aligned with the other respective said stub shaft, each said shaft having a diameter substantially equal to the width of said grooves in said shaft seat strips.

4,697,705

JEWELRY DISPLAY DEVICE

Richard S. Garganese, 30 Celestia Ct., North Kingstown, R.I. 02852

Filed Dec. 9, 1986, Ser. No. 939,781
Int. Cl.[4] B65D *73/00*
U.S. Cl. 206—488 **6 Claims**



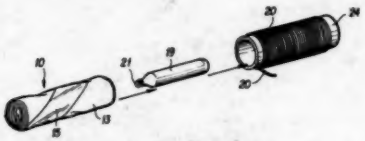
1. A display device for jewelry articles having a pin stem comprising a display card with a plurality of open top compartments formed as an integral part of the display card containing resilient material and of a size sufficient to accomodate placing openings for pin stems at varying locations, a separate compartment containing hardware for the article displayed, a decorative flexible layer overlying the open portion of the compartments in the card, and an opening through the flexible layer and the resilient material of a diameter less than the diameter of the pin stem whereby the pin stem inserted into the opening will be gripped.

4,697,706

LIFE SPOTTING DISTRESS SIGNAL PACKAGE

Donald L. Schaller, 13623 Blue Ridge Ave., P.O. Box 76, Blue Ridge Summit, Pa. 17214

Filed Nov. 7, 1986, Ser. No. 928,011
Int. Cl.[4] B64B *1/40*
U.S. Cl. 206—573 1 Claim



1. A hiker's containerized compact transport life spotting package comprising a lighter than air inflatable cylinder shaped device of an international orange composite having an inflated diameter of the order of one foot in diameter and a length of the order of five feet,

said cylinder shaped inflatable device being of a metallic foil over plastic composite and being radar reflective, the bottom of said cylinder shaped inflatable device having an apron for the attachment of signaling devices by way of grommet eyelets and Velcro patches,

a mirror finish helical strip of highly light reflective material extending from the top of the cylinder and winding axially 360° down and around the cylinder to its bottom,

a helium charged no return cannister, valve means for introducing helium from the cannister to the cylinder shaped inflatable device secured to the base of said device having means to puncture the top of the cannister and maintain a seal therewith while permitting the helium from the cannister to inflate the cylinder shaped device, a length of non-conductive line, one end of which is to be secured to the bottom of said inflatable cylinder shaped device and the other end of which is to be secured to a person to be rescued or an earth secured fixed object close thereto to locate and identify the subject to be rescued signalled by the airbourne cylindrical device,

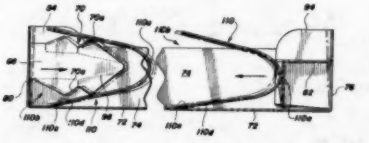
and a compact transport container retaining said cylinder shaped inflatable device in a flattened and rolled condition, said helium cannister, said valve means and said non-conductive line all nested coaxially with said transport container for transport by an individual over rough terrain.

4,697,707

CONTAINER FOR FRAGILE FOOD SUBSTANCE

Bernard Engdahl, 15282 Moulins Circle, Irvine, Calif. 92714

Filed Apr. 30, 1986, Ser. No. 857,720
Int. Cl.[4] B65D *81/02*
U.S. Cl. 206—585 6 Claims



1. An improved packaging blank for taco shells, each shell being brittle and similarly configured and dimensioned, the shells being contiguously aligned to each other by having the interior surface of each shell disposed about the exterior surface of the adjacent shell, the improvement comprising:

a base panel for supporting the shells along a plane;

a top panel extending from the base panel and having a planar surface that can be positioned perpendicular to a first axis;

a bottom panel extending from the base panel and having a planar surface that can be positioned perpendicular to the first axis;

a pair of side panels extending from the base panel, each side panel having a planar surface that can be positioned perpendicular to a second axis that is perpendicular to the first axis, the planar surfaces capable of remaining in contact with the edges of the shells;

first means fixed to the planar surface of the top panel for maintaining the shells in a position along the base panel by operatively engaging the opposing interior surfaces of a first shell that interfaces the top panel, the first means including at least a first holding member having perforations and resilient, serrated opposing edge surfaces that are configured and dimensioned to extend along the interior surfaces of the first shell without contacting the bottom portion thereof particularly upon forces external to the blank being applied along the first axis; and

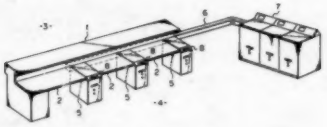
second means fixed to the planar surface of the bottom panel for maintaining the shells in a position along the base panel, the second means having a flat surface area that operatively interfaces an exterior surface of a second shell to contact such exterior surface upon forces external to the blank being applied along the first axis.

4,697,708

AUTOMATIC BANK NOTE DEPOSITING AND DISPENSING MACHINE

Masao Goto; Haruo Kimura; Toshihiko Okada; Katsunori Yuasa, and Tetuzo Ito, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 12, 1985, Ser. No. 743,967
Claims priority, application Japan, Jun. 12, 1984, 59-119114; Jun. 12, 1984, 59-119115
Int. Cl.[4] B07C *5/34*
U.S. Cl. 209—534 6 Claims



1. An automatic bank note depositing and dispensing machine, comprising:

a housing;

a plurality of bank note containers disposed in said housing and respectively containing bank notes of designated denominations, a prescribed number of bank notes which were previously set therein;

first detector means for detecting when the number of bank notes contained in each of said bank note containers becomes less than a first designated number;

second detector means for detecting when the number of bank notes contained in each of said bank note containers becomes more than a second designated number;

a slot formed in a rotary drum for receiving bank notes thrown in collectively;

a receiver for feeding bank notes from said slot and conveying them in succession;

a discriminator for judging whether the bank notes conveyed in succession by said receiver are geniune or false;

a first pool for pooling bank notes discriminated as being genuine by said discriminator and a second pool for pooling bank notes discriminated as being false;

a first conveyor means for connecting said first and second pools with said slot for returning the bank notes discriminated as being false from said second pool to said slot and

for returning the bank notes discriminated as being genuine from said first pool to said receiver via said slot;

wherein said discriminator then judges the denomination of the genuine bank notes previously pooled in said first pool and thereafter conveyed in succession by said receiver;

a sorting means for sorting said bank notes discriminated by said discriminator for denomination into said respective designated denomination bank note containers;

a second conveyor means for taking out the bank notes contained in said plurality of the bank note containers and conveying them to said discriminator;

a bank note conveyor device provided outside of said housing for conveying bank notes from an external device to said housing in response to an output signal from said first detector means and for sending bank notes from said housing to said external device in response to an output signal from said second detector means;

a delivery part provided in said housing for receiving bank notes conveyed in response to the output signal from said first detector means and for collectively sending bank notes to said bank note conveyor device in response to the output signal from said second detector means; and

a third conveyor means for collectively conveying the bank notes received at said delivery part to said slot via said first conveyor means in response to said output signal from said first detector means and for sending the bank notes received

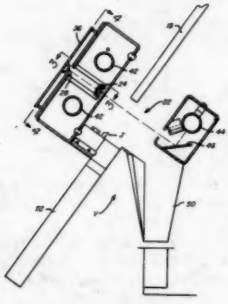
from said discriminator to the delivery part in response to said output signal from said second detector means.

4,697,709

SORTER FOR AGRICULTURAL PRODUCTS

Elias H. Codding, Houston, Tex., assignor to Delta Technology Corporation, Houston, Tex.

Filed Sep. 3, 1985, Ser. No. 772,178
Int. Cl.[4] B07C *5/342*
U.S. Cl. 209—549 **22 Claims**



13. An apparatus for sorting agricultural products based on their color as they fall in a stream through an illuminated viewing chamber, comprising:

(a) optical station means in the viewing chamber for sensing the light reflected from the products as they pass through the viewing chamber and the illumination level of the viewing chamber at a position unaffected by the products;

(b) light source means for illuminating the viewing chamber and the products passing therethrough;

(c) said optical station means comprising a plurality of aligned optical sensors for sensing the light reflected from the products and forming electrical signals indicative of the sensed light and a further aligned optical sensor for sensing the illumination level of the optical station means at a position unaffected by the products and forming an electrical signal indicative of the sensed illumination level;

(d) processing circuit means for comparing the electrical signals indicative of reflected light with a reference signal to determine if the products are acceptable;

(e) said processing circuit means including amplification means for amplifying the signal formed by said product light reflection optical sensors, the gain of said amplification means controlled by the signal formed by said illumination level optical sensor; and

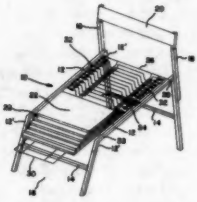
(f) ejector means for ejecting unacceptable products from those determined acceptable.

4,697,710

CARPET DISPLAY STAND

Raymond J. Gradecki, Mundelean; James M. McLaughlin, Lake Zurich, and Gerald R. Sorensen, Elgin, all of Ill., assignors to NCM International, Inc., Arlington Heights, Ill.

Filed Dec. 30, 1985, Ser. No. 814,662
Int. Cl.[4] A47F *7/16*
U.S. Cl. 211—45 **8 Claims**



1. A carpet display stand for cascade display of carpet samples without penetration of the carpet samples through use of binder posts and fasteners, comprising:

a support assembly, the assembly having legs for supporting the stand;

a basket carried within the support assembly, the basket having two generally horizontal and two generally vertical framing members, a plurality of parallel wires extending between the vertical framing members, at least one portion of each wire being downwardly deformed to define a generally U-shaped section such that remaining portions of the wire define elevated sections relative to the U-shaped section, at least one support wire generally perpendicular to and spanning the parallel wires, the one support wire joining each parallel wire at a lowermost portion of the U-shaped section; and,

means for frictional retention of one corner of a carpet sample, said frictional retention means being joined to the vertical framing members of the basket, each frictional retention means positioned immediately below each end of the parallel wires of the basket, adjacent frictional retention means defining a slot to receive a corner portion of the carpet sample.

4,697,711

TRAY ACCUMULATOR FOR SOILED WARE CONVEYOR

Tore H. Noren, Petaluma, Calif., assignor to The Stero Company, Petaluma, Calif.

Filed Jun. 20, 1986, Ser. No. 876,638
Int. Cl.[4] A47F *5/00*
U.S. Cl. 211—182 **4 Claims**

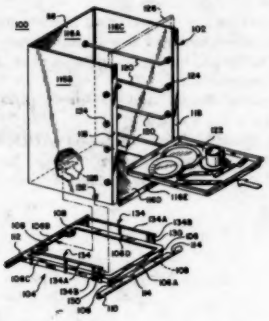
1. An improved tray accumulator comprising:

a dolly adapted to be supported upon and moved along a track circuit;

a tray rack adapted to be removably supported upon said dolly in retention position and;

cooperating mounting means on said rack and dolly for retaining said tray rack to said dolly, yet permitting removal of said tray rack from said dolly without requiring

the use of tools, said mounting means comprising interfering portions of said tray rack and said dolly whereby said tray rack is stably retained on said dolly when in said



retention position, and said interfering portions being made non-interfering by moving said tray rack out of its retention position, whereby the rack can readily be removed for cleaning purposes.

4,697,712

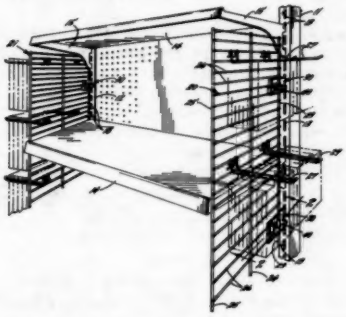
BRACKET FOR A GRID-TYPE RACK

Stanley C. Valiulis, Rockford, Ill., assignor to Southern Imperial, Inc., Rockford, Ill.

Filed Dec. 22, 1986, Ser. No. 944,860

Int. Cl.[4] A47B *47/00*

U.S. Cl. 211—187 **18 Claims**



13. The combination of, an upright member having an outer side with vertically spaced and vertically elongated slots therein, a grid-type rack, and a bracket for fastening said rack releasably to said upright member in outwardly extending relation therefrom, said rack comprising an inner vertical rod having inner and outer sides and having two lateral sides facing oppositely of one another, said rack further comprising a series of horizontal rods fastened to, extending outwardly from and spaced vertically along said vertical rod, said horizontal rods having end portions overlapping one lateral side of said vertical rod, said combination being characterized in that said bracket comprises an upright plate having one side lying against the opposite lateral side of said vertical rod in laterally spaced relation with said horizontal rods, said plate having inner and outer edges and top and bottom edges, a hook formed integrally with said plate adjacent the junction of said inner edge and said top edge and extending downwardly alongside a portion of said inner edge in inwardly spaced relation therefrom, said hook lying in the plane of said plate and extending into one of said slots to attach said plate releasably to said upright member, means for clamping said plate to said rack, said clamping means comprising a clamping member having a center web positioned between two adjacent horizontal rods in face-to-face engagement with said one side of said plate, a vertical curl of generally U-shaped cross-section formed integrally with and projecting laterally from said web, said vertical curl being looped partially around said vertical rod and being position between said two adjacent horizontal rods, a pair of vertically spaced horizontal curls of generally U-shaped cross-section formed integrally with and projecting laterally from said web outwardly of said vertical curl, said horizontal curls being looped partially around said two adjacent horizontal rods, a flange projecting laterally from said plate adjacent the outer edge thereof and engaging at least one of said horizontal rods of said rack, tab means projecting laterally from said plate adjacent the inner edge thereof and below said hook and engaging the outer side of said upright member, and a threaded fastener extending between said web and said plate and adapted to be tightened to clamp said web to said plate and to clamp said horizontal curls to said two adjacent horizontal rods.

4,697,713

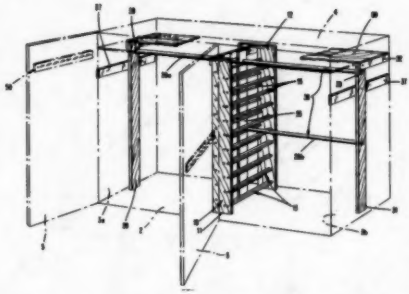
CLOSET STORAGE ARRANGEMENT

Nicholas Pryor, 8963 Burton Way #304, Los Angeles, Calif. 90048

Continuation-in-part of Ser. No. 366,536, Apr. 8, 1982, abandoned. This application Aug. 2, 1985, Ser. No. 761,801

Int. Cl.[4] A47F *5/00*

U.S. Cl. 211—189 **17 Claims**



1. A household closet having enhanced capacity for storing clothing and footwear items for men and women, comprising:

a floor;

two transversely spaced apart left and right side walls;

a back wall extending between said side walls;

means having a door opening spaced forwardly from said back wall;

a generally horizontal hang bar mounted so that the axis thereof extends generally transversely of the closet at a location between said back wall and said door opening and being accessible through said door opening for supporting garments on hangers suspended from said hang bar;

a multi-tier shoe case supported on said floor at a location between said back wall and said door opening and between said side walls, said shoe casing facing sideways in the closet to minimize the lateral clothes hanging space made unavailable for hanging clothes by said shoe case, said shoe case having a rear end near said back wall and a front end spaced forwardly a fixed distance from said rear end toward said door opening, said shoe case further having a generally vertical face side through which shoes conveniently may be inserted and a generally vertical opposite side, said generally vertical face side of said shoe case being open for easy visibility of shoes in said case,

each tier of said shoe case being provided by three unitary horizontal shoe support members mounted to extend from back to front of the closet, a first of said shoe support members of each tier being located near said opposite side of the shoe case at a first level and the second and third of said shoe support members of each tier being located near said face side of the shoe case in horizontally spaced relationship one to another at a lower second level;

the horizontal spacing between said second and third support members of a tier being great enough to cause the rear of a low heel shoe whose front sole portion has been rested on said first support member to bear against an inside portion of the outermost of said second and third support members to prevent the shoe from sliding off the shoe support members; and,

the spacing between said second and third support members and said first support member of a tier being such that a high heel shoe may be securely supported on the support members of the tier with its front sole portion resting on at least one of said second and third support members and its heel hooked over said first support member.

4,697,714

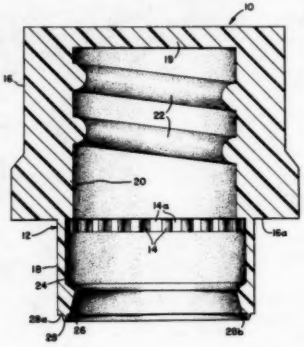
BREAK-AWAY CONTAINER CLOSURE

Edward J. Towns, Summit, and Edward M. Brown, Livingston, both of N.J., assignors to TBL Development Corporation, Livingston, N.J.

Continuation-in-part of Ser. No. 697,962, Feb. 4, 1985, abandoned. This application Apr. 17, 1986, Ser. No. 853,198

Int. Cl.[4] B65D *41/34*

U.S. Cl. 215—252 **19 Claims**



1. A break-away closure for a container, comprising a molded body having an upper portion, a lower portion and frangible section interconnecting said upper and lower portions, said lower portion having at an exterior surface thereof detent means for retention of said lower portion with apparatus effecting stripping of said closure from a forming core in the course of production thereof, said exterior surface including flat surface expanses extending transversely of said lower portion and respectively aside said detent means.

4,697,715

ANTICOCKING HIGH TORQUE REMOVAL CLOSURE ASSEMBLY

Mario Beruvides, Miami, Fla., assignor to Waynesboro Textiles, Forest City, N.C.

Filed Sep. 2, 1986, Ser. No. 901,925

Int. Cl.[4] B65D *41/04*

U.S. Cl. 215—330 **14 Claims**

1. An anticocking high torque removal closure assembly comprising:

a container having a neck;

a cap threadingly received on said neck;

a first thread on said neck;

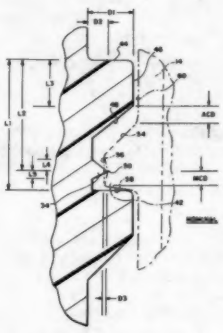
a second thread in said cap;

a rib in said cap spaced from a revolution of said second thread and having a sharp outer edge

said first thread having an upper surface, a side surface and a lower surface;

said second thread having an upper surface, a side surface and a lower surface;

a first allowable cock dimension (ACD) being defined between a horizontal line through the junction of said side surface and said lower surface of said second thread and a



horizontal line through the junction of said neck with said upper surface of said first thread when said cap is received on said neck;

a second minimum cock dimension (MCD) being defined between a horizontal line through said sharp outer edge of said rib and a horizontal line through the junction between said side surface and said lower surface of said first thread when said cap is received on said neck; and

said minimum cock dimension MCD being greater than said allowable cock dimension for extremes of tolerances of said cap and said neck, such as neck high/cap low or neck low/cap high, to prevent cocking of said first thread above said rib.

4,697,716

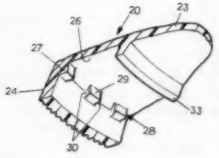
CLOSURES WITH CAST SEALING GASKET

George V. Mumford, Ventura, Calif., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jul. 6, 1982, Ser. No. 395,394

Int. Cl.[4] B65D *53/02*

U.S. Cl. 215—352 **7 Claims**



1. A closure for a container comprising

a body of synthetic plastic material including a top wall and a peripheral skirt,

said skirt having means thereon for engaging a container,

a channel on the inner surface of the top wall at the area of juncture of the top wall and the skirt,

said channel comprising an integral bottom wall and radially spaced integral side walls,

at least one of said side walls comprising circumferentially spaced generally vertically extending integral ribs,

each said rib extending radially from said one wall and having an end surface and side surfaces,

said side surfaces of each said rib extending from said side wall toward said end surface, said side surfaces tapering toward one another from the end surface to the side wall to define a re-entrant portion between each side surface and the side wall into which the gasket material extends,

and a sealing gasket of gasket material cast in situ in said channel,

said gasket interlocking with the spaced ribs.

4,697,717

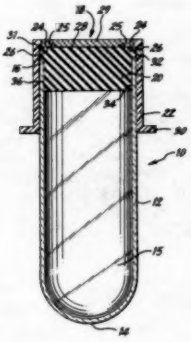
RUBBER/PLASTIC STOPPER COMPOSITE WITH MECHANICAL ADHESIVE JOINTS

Nicholas A. Grippi, Nutley, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Aug. 18, 1986, Ser. No. 897,963

Int. Cl.[4] B65D *41/28*

U.S. Cl. 215—354 **5 Claims**



1. A closure assembly for evacuatable tubes for subsequently receiving samples of body fluids, comprising

(a) an annular elastomeric stopper body for insertion into the open end of an evacuatable tube;

(b) an annular flange integral with said stopper body adjacent the top surface thereof for seating on the top edge of an evacuatable tube;

(c) a flexible thermoplastic cap mounted on said annular elastomeric body;

(d) a top surface on said flexible cap;

(e) an annular skirt depending from said flexible cap top surface for surrounding the upper outer surface of an evacuatable tube;

(f) a central opening in said top surface of said flexible cap for exposing the central portion of said stopper body;

(g) a plurality of circumferentially spaced bores extending through said top surface of said thermoplastic cap;

(h) said plurality of said bores surrounding said central opening in said top surface;

(i) a plurality of portions of a cured adhesive material in each of said spaced bores;

(j) said plurality of portions of adhesive material filling said bores and adhering to the top surface of said elastomeric stopper body at points adjacent each of said bores; and

(k) whereby said plurality of portions of adhesive material hold said elastomeric stopper body and said flexible thermoplastic cap together.

4,697,718

DIMENSIONALLY STABLE THERMOPLASTIC TUBULAR ARTICLES

Peter E. Butcher, Faringdon; David A. Dick, Wantage; James W. Nicholas, Wantage; Melvin E. R. Robinson, Wantage, and Glyn Staines, Swindon, all of England, assignors to Metal Box P.L.C., Reading, England

Division of Ser. No. 599,697, Apr. 12, 1984, Pat. No. 4,587,075. This application Feb. 21, 1986, Ser. No. 831,710

Claims priority, application United Kingdom, Apr. 22, 1983, 8310966

Int. Cl.[4] B65D *25/54*

U.S. Cl. 220—82 R **1 Claim**

1. In a food container comprising an open-ended cylindrical body which is made of a crystallisable polyethylene terephthalate material, and end closure means at eahc end of said body forming with said body a closed container, said body material being biaxially oriented and the container body having been heat-set, whilst restrained against radial or axial shrinkage, the improvement residing in that the container body has been heat-set at a temperature between about 180° C. and about 240° C., whereby said container is able to withstand hot-filling, pasteurisation or sterilisation temperatures of up to about 120° C. without undergoing shrinkage of its linear dimensions by more than 3%.

4,697,719

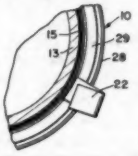
FOIL-LID COMBINATION FOR CONTAINERS

David O. Allen, Wilmington, Ohio, assignor to Allen Tool Company, Inc., Wilmington, Ohio

Filed Nov. 3, 1986, Ser. No. 926,566

Int. Cl.[4] B65D *51/22*

U.S. Cl. 220—258 **15 Claims**



1. A foil-lid arrangement for containers including a cylindrical wall configuration and an open end thereof surrounded by an outwardly curved bead surface for packing of food including snacks, chips, bread crumbs as well as plastic tubs and cans, such as margarine and yogurt tubs, and cake frosting and shortening cans to be provided with a sealing closure, comprising:

a lid body of plastic having an outer periphery projecting outwardly over the bead surface;

dual skirt means including an outer skirt portion and an inner skirt portion spaced and extending axially from said outer periphery of said lid body and having a slit space formed therebetween open only in a direction away from said outer periphery; and

a foil-membrane liner inserted into said lid body and includ-

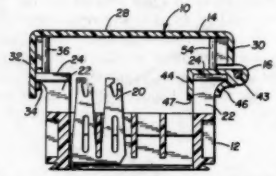
ing an outer periphery and at least one outwardly projecting tab joined to said outer periphery of said liner, said projecting tabs being tucked into said slit space prior to installation of said circular lid body including said inner skirt portion in engagement with said bead surface such that said foil-membrane liner is maintained together with said lid body including said projecting tabs inserted snugly in the slit space between said outer and inner skirt portions, said projecting tabs however also providing a tamper-indicating sign if said lid body is removed from said bead surface prematurely since said projecting tabs do not re-engage the slit between outer and inner skirt portions upon replacing said lid body relative to the container bead surface but rather said projecting tabs stick out below said outer and inner skirt portions indicating that said lid body has been removed and replaced.

4,697,720

TERMINAL BLOCK COVER

Kenneth W. Hotchkiss, Golden, and Arthur B. Woodward, Lakewood, both of Colo., assignors to Proto-Tel, Inc., Boulder, Colo.

Filed Oct. 20, 1986, Ser. No. 920,658
Int. Cl.[4] B65D *43/14, 51/04*
U.S. Cl. 220—337 **15 Claims**



1. A terminal block cover for use with a terminal block of the type having a longitudinally extending face, bottom, and first and second opposite sides, with a fanning strip located along each of the first and second longitudinal sides and defining a laterally extending lip at the side margins of the terminal block face, comprising:

a cover body for, in use, covering the face of a terminal block;

a latch means depending from said cover body for, in use, releasably engaging the first lateral side of the terminal block; and

a hinge means depending from the cover body for, in use, engaging a fanning strip on the second lateral side of the terminal block and permitting the cover body to pivot thereon, wherein said hinge means comprises:

a clip means for engaging the fanning strip at a substantially fixed position;

a separable pivot means connected between the clip means and cover body for permitting pivotal movement of the cover body with respect to the clip means and permitting removal of the cover body from connection with the clip means; and

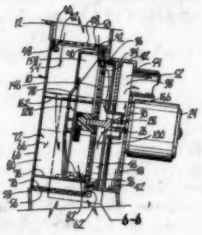
a positional locking means for preventing removal of the cover body from connection with the clip means only when the cover body and clip means are in first predetermined relative pivotal positions on said pivot means, and permitting removal of the cover body from connection with the clip means when the cover body and clip means are in second predetermined relative pivotal positions on the clip means.

4,697,721

PILL STORAGE AND DISPENSING CASSETTE

Robert D. Johnson; John W. Havener; Mark F. Reyner; Franklin W. Reyner, Jr.; Loren K. Whitver, and Norman W. Kilburn, all of West Union, Iowa, assignors to Pharmaceutical Innovators Ltd., West Union, Iowa

Filed Jun. 24, 1985, Ser. No. 748,404
Int. Cl.[4] B65B *57/20*
U.S. Cl. 221—211 **3 Claims**



1. An improved pill storage and dispensing cassette for use with a pill counting maching having a vacuum source therein, said cassette including a front side wall, a back side wall, opposite end walls, a top wall and a bottom wall defining a storage chamber; a rotatable pill conveying wheel positioned in said back side wall and having a plurality of openings arranged annularly about the axis of rotation of said wheel for providing communication between said chamber and said vacuum source and for holding pills on said wheel upon actuation of said vacuum source; a discharge in opening in communication with said chamber; and a pill separator means positioned to operatively separate said pills from said wheel such that said pills are discharged through said discharge opening upon said wheel having conveyed said pills to said separator means; improvement comprising:

an adjustment means in said chamber adjacent said wheel and being movably adjustable to selectively extend across a portion of at least one of said openings in said wheel during rotation of said wheel whereby each opening is limited to holding a single pill;

an access opening in said front wall to allow an adjustment tool to extend across said storage chamber to said adjustment means for providing continuous adjustment of said adjustment means during operation of said machine; and

a guide tube extending substantially between said access opening and said adjustment means to align said tool with said adjustment means and to prevent pills from falling out of said cassette through said access opening.

4,697,722

METHOD FOR DESIGNING AND MAKING A TAPPING STOPPER

Tadao Saito, Adachi, and Riichi Ogawa, Matsudo, both of Japan, assignors to Yoshino Kogyosho Co., Ltd., Japan

Continuation-in-part of Ser. No. 693,988, Jan. 23, 1985, abandoned, which is a continuation of Ser. No. 370,292, Apr. 2, 1982, Pat. No. 4,531,657. This application Oct. 7, 1986, Ser. No. 916,276
Int. Cl.[4] B65D *5/72*
U.S. Cl. 222—571 **2 Claims**

1. A method of designing and making a tapping stopper to be tightly fitted to the mouth of a bottle containing a liquid, the tapping stopper comprising:

a pouring cylinder with a cylindrical surface, an annular lip extending perpendicularly to an axis of said cylindrical surface, and a transitional surface, said transitional surface having a curved surface joining an end of the cylindrical surface and an inner diameter of the annular lip;

an auxiliary external cylinder; and

a bottom plate connecting the pouring cylinder and the auxiliary external cylinder, the pouring cylinder and the auxiliary external cylinder being arranged to form a peripheral groove and the auxiliary external cylinder being formed below the pouring cylinder by a certain height difference;

the method comprising:

determining a viscosity of the liquid to be poured from a tapping stopper;

determining the appropriate height difference between the pouring cylinder and the auxiliary external cylinder of such a stopper for a liquid having the determined viscosity, selecting said appropriate height difference such that during pouring of the liquid from the pouring cylinder, the flow of liquid from the pouring cylinder will pull up on any flow of liquid from the auxiliary cylinder due to the surface tension of the liquid so that any flow of liquid from the auxiliary cylinder will be combined with the flow of liquid from the pouring cylinder to prevent trickling; and

manufacturing said tapping stopper having the determined appropriate height difference as said certain height difference between the pouring cylinder and the auxiliary external cylinder thereof.

4,697,723

TENSIONING STRUCTURE FOR A SLIDING CLOSURE UNIT

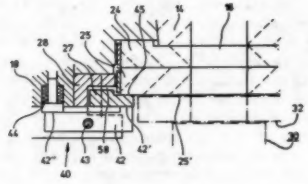
Robert Fricker, Unterägeri, Switzerland, assignor to Stopinc Aktiengesellschaft, Baar, Switzerland

Filed Mar. 21, 1986, Ser. No. 842,808

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1985, 3512798

Int. Cl.[4] C21C *5/46*; B22D *41/08*

U.S. Cl. 222—600 **7 Claims**



1. In a sliding closure unit for controlling the discharge of molten metal from a metallurgical vessel and of the type including a stationary refractory plate, a stationary housing mounting said stationary refractory plate on the metallurgical vessel with a discharge opening of said stationary refractory plate aligned with a discharge nozzle of the metallurgical vessel, a movable refractory plate having a discharge opening, a slide frame supporting said movable refractory plate and movable in a direction of movement between an open position with said discharge openings of said movable and stationary refractory plates in alignment and a closed position with said discharge openings out of alignment, and tensioning means mounted on said stationary housing for sealingly pressing said movable refractory plate against said stationary refractory plate, the improvement comprising means for distributing evenly the force of said tensioning means along opposite sides of said movable refractory plate, which sides extend in said direction of movement, said distributing means comprising:

strip members, separate from said movable refractory plate, mounted in said slide frame for movement relative to said slide frame and relative to said movable refractory plate in the direction of the thickness of said movable refractory plate; and

a respective said strip member being positioned on each said opposite side of said movable refractory plate and being positioned between said tensioning means on said side and the bottom surface of said movable refractory plate on said side;

whereby said tensioning means press said strip members toward and against said bottom surface of said movable refractory plate along respective said sides thereof.

4,697,724

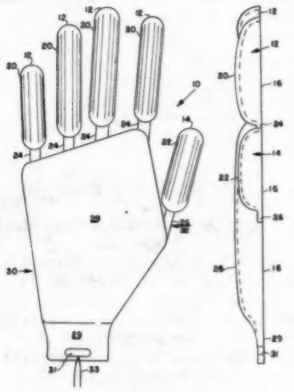
RESILIENT GLOVE TREE

Bruce Pitcher, 259 Los Prados Dr., Safety Harbor, Fla. 33572

Filed Oct. 20, 1986, Ser. No. 920,467

Int. Cl.[4] A41D *1/00*

U.S. Cl. 223—78 **1 Claim**



1. A glove tree, comprising:

a resilient palm member of solid construction;

a plurality of resilient finger members integrally formed with said palm member and extending outwardly therefrom in the plane of said palm member;

a resilient thumb member integrally formed with said palm member and extending outwardly therefrom in the plane of said palm member;

each of said finger members and thumb member having a semicircular transverse section;

each of said finger members and said thumb member having an elongate distal portion and a truncate proximal portion;

said respective proximal portions being integral to said palm member;

said distal portions being enlarged in width and thickness relative to the width and thickness of said proximal portions;

said palm member and said finger members and thumb member respectively having a flat bottom surface and all of said flat bottom surfaces being coplanar with respect to one another;

said finger members, said thumb member and said palm member being deformable in any direction so that said glove tree is deformable as a unit into a space smaller than a space occupied by it in its non-deformed configuration to the end that said glove tree is inserted into a glove

means in its deformed configuration and regains its non-deformed configuration after entry into said glove means;

said glove tree further comprising a wrist means, said wrist means being contiguous to and integal with said palm member and being positioned opposite to said finger members and thumb member;

an aperture means formed in said wrist means, centrally thereof;

a cord means slidingly received in said aperture means so that a first glove tree can be tied to a second glove tree;

a flat base plate member;

a slot means formed in said flat base plate member;

said slot means specifically configured and dimensioned to slidingly but snugly receive therein said wrist means so that said glove tree is displayed in an upstanding disposition when its wrist means is inserted into said slot means;

said slot means being arcuate in form so that insertion of said wrist means thereinto requires conforming said wrist means to the shape of said slot means;

and wherein said wrist means has a thickness substantially equal to the thickness of said finger and thumb proximal portions;

said thickness of said wrist means and of said proximal portions of said finger members and said thumb member being less than half the thickness of said finger member distal portions, said thumb member distal portion and of said palm member.

4,697,725

APPARATUS FOR MOUNTING FLASHLIGHTS TO BICYCLES

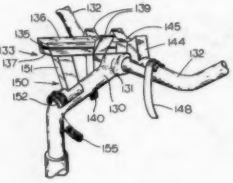
Mallory F. Miree, 3512 Springhill Rd., Birmingham, Ala. 35223

Continuation-in-part of Ser. No. 775,797, Sep. 13, 1985, Pat. No. 4,618,081, which is a continuation-in-part of Ser. No. 559,098, Dec. 7, 1983, Pat. No. 4,541,555. This application Sep. 2, 1986, Ser. No. 901,151

The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.

Int. Cl.[4] F21V *33/00*

U.S. Cl. 224—41 **10 Claims**



1. A mount for mounting a flashlight to a bicycle of the type having a handlebar from which a steering stem neck extends, and with the mount comprising a cradle having a concave upper surface in which a flashlight may be cradled, a forward crossarm extending laterally from a forward end of said cradle and which has a bottom surface shaped to be mated against the handlebar, a stanchion extending downwardly from a rear end of said cradle and which has a bottom surface shaped to be mated against the steering stem neck, and binding means for binding said forward crossbar to the handlebar, the bottom of said stanchion to the steering stem neck, and a flashlight to said cradle.

4,697,726

DEVICE FOR CUTTING A STRIP OF PAPER OR SIMILAR MATERIAL ALONG PREESTABLISHED TRANSVERSE LINES OF WEAKNESS

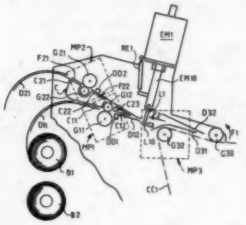
Michel M. Gaucher, Le Mesnil Saint Denis, France, assignor to Electronique Serge Dassault, Paris, France

Filed Dec. 17, 1985, Ser. No. 810,080

Claims priority, application France, Sep. 11, 1985, 85 13499

Int. Cl.[4] B65H *35/10*

U.S. Cl. 225—100 **8 Claims**



1. Apparatus for cutting a strip of paper or similar material along preestablished transverse lines of weakness comprising:

an approximately planar blade having a leading edge for engaging the strip;

drive means for reciprocally displacing the blade along its plane between two positions in which the leading edge of the blade is either retracted from the strip or moved forward to sever the strip;

a strip feeder for feeding the strip toward the blade;

positioning means for moving the strip while the blade is in the retracted position so the strip extends across the plane swept by the leading edge of the blade, with a line of weakness on the strip extending approximately in the plane of the blade, the positioning means also being adapted to hold a portion of the strip in tension in the longitudinal direction while the leading edge of the blade is moved to its forward position for severing the strip transversely along or in proximity to the line of weakness;

the positioning means including a pair of stepper motors arranged to act on areas of the strip positioned on opposite sides of the planar blade, a first one of the stepper motors being located between the strip feeder and the plane of the blade for pulling the strip from the feeder and passing it across the plane until the strip is taken up by the second stepper motor which is arranged for moving the strip away from said plane, the first stepper motor having means for thereafter urging the strip in an opposite direction against the action of the second motor to apply said tension to said portion of the strip and to also hold said portion of the strip stationary;

the leading edge of the blade having a blunt profile and a longitudinally concave shape for engaging the tensioned and stationary portion of the strip progressively from the sides toward the middle as the blade is moved toward its forward position for severing the strip;

the second motor being arranged for advancing the cutoff portion of the strip for further processing after a strip has been severed.

4,697,727

DOCUMENT FEED TRACTOR

Dohn D. Hubbard, II, Somerset, Mass., assignor to Precision Handling Devices, Inc., Fall River, Mass.

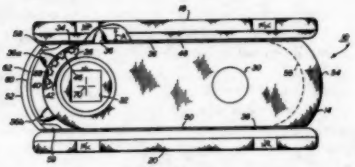
Filed Nov. 25, 1985, Ser. No. 801,439

Int. Cl.[4] G03B *1/22*

U.S. Cl. 226—74 **8 Claims**

1. In a tractor for feeding perforated webs having an endless belt with pins projecting outwardly and lugs projecting in-

wardly therefrom, a sprocket having receptacles for said lugs, a frame in which said sprocket is journaled and which defines a path of travel for said belt extending along opposite side along opposite sides of the frame, from at least one of which sides said pins are presented for engagement with the perforations in the web, and around said sprocket, an improved mechanism for retaining said belt with said lugs in engagement with



said sprocket as said belt rotates with said sprocket between said sides of said belt, said mechanism comprising a member adjacent said sprocket presenting a retaining surface spaced outward from said pins a distance slightly greater than the altitude of said pins to provide a clearance of about a few thousandths of an inch to keep the lugs in engagement with the sprocket, and said member being disposed between extensions of said sides of said path.

4,697,728

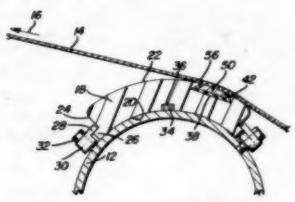
PAPER WEB SPREADING SHOE

William D. Sawyer, Sr., 1512 Elizabeth, and William D. Sawyer, Jr., 1511 N. 7th St., both of West Monroe, La. 71291

Filed Jan. 16, 1986, Ser. No. 819,343

Int. Cl.[4] B65H *23/10, 23/34;* **D06C** *3/00*

U.S. Cl. 226—196 **7 Claims**



1. A paper making machine having a spreader bar over which a paper web or sheet passes prior to being taken up on a takeup reel, a spreader shoe comprising an elongated base, means mounting said base longitudinally on the spreader bar, and an elongated wear resistant strip mounted on the outer surface of the base and extending throughout the length of the base and spreader bar, said wear resistant strip being constructed of a plurality of segments with each segment being trapezoidal and provided with inclined end faces to eliminate sharp edges engaging the paper sheet or web, said wear resistant strip being provided with a layer of silicone on the inner surface thereof interfacing with the base to enable relative movement and accommodate variation in thermal expansion of the wear resistant strip and base.

4,697,729

TIP FOR REMOVING COMPONENTS FROM A SUBSTRATE

Linus E. Wallgren, Rockville, Md., assignor to Pace Incorporated, Laurel, Md.

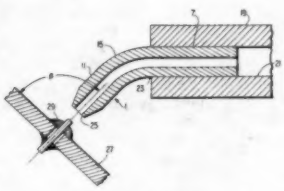
Continuation-in-part of Ser. No. 636,267, Jul. 31, 1984, abandoned.

This application Jul. 19, 1985, Ser. No. 756,692

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.[4] B23K *3/04*

U.S. Cl. 228—20 **15 Claims**



1. A replaceable tip for a hand-held pencil-like solder extractor for removing electronic components from a substrate, said tip comprising:

a tubular member having a central bore of substantially constant cross-section, said tubular member comprising a first linear section of predetermined length having an axis, said first linear section having a first end coaxially receivable within a tubular heating element passageway in said solder extractor, a second linear section of predetermined length having an axis and a second end, and a detent means intermediate said first and second sections for limiting the length of said tubular member receiving within said solder extractor passageway and maintaining said second end a fixed distance from said solder extractor, said axis of said first section forming an angle with said axis of said second section; and

a component removal head connected to said second end, said head having at least two heatable spaced-apart shoulders for heating lead connections of said component to melt solder or the like at said lead connections, said component being receivable between said spaced-apart shoulders, and suction means in communication with said central bore for holding said component between said shoulders upon the application of suction through said central bore, whereby said component can be removed from said substrate upon melting of said solder at said lead connections.

4,697,730

CONTINUOUS SOLDER SYSTEM

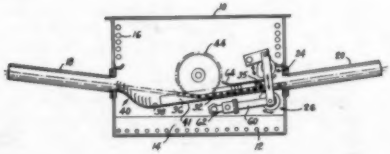
Donald J. Spigarelli, Carlisle; Douglas J. Peck, North Andover, and James L. Finney, Hudson, all of Mass., assignors to The HTC Corporation, Concord, Mass.

Continuation of Ser. No. 614,288, May 25, 1984, abandoned.

This application Jun. 9, 1986, Ser. No. 872,300

Int. Cl.[4] B23K *3/04, 3/06*

U.S. Cl. 228—37 **4 Claims**



1. A vapor processing system comprising a vessel for containing a processing vapor,

means for heating an electronic liquid contained within said vessel to establish a saturated vapor zone,

an inlet throat communicating with and sloped downwardly towards said vessel,

an opposing exit throat communicating with and sloped downwardly towards said vessel,

a pair of conveying chains extending through said inlet throat, vessel and exit throat,

frame means for retaining printed circuit boards for transport through the system,

means for coupling the forward end of said frame means to said conveying chains,

spaced, parallel guide means extending across said vessel from the inlet to the exit throat for supporting the opposed rearward corners of said frame means,

said guide means each including a first linear portion substantially colinear with the bottom surface of said exit throat and a second arcuate portion for merging the bottom surface of said inlet throat with said first linear portion, said first linear portion comprising means for engaging the forward end of said frame means when said frame is parallel to said inlet throat, whereby following such engagement said forward end will be displaced upwardly and said rearward end will follow said second arcuate portion until said frame means becomes parallel to said first linear portion.

4,697,731

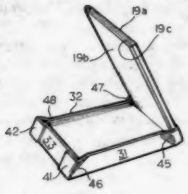
COLLAPSIBLE BULK SHIPPING CONTAINER WITH TAKE-OUT FRONT PANEL

Teddy R. Snyder, Maumee, Ohio, assignor to OI Forest Products STS Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 859,957, May 5, 1986. This application Oct. 23, 1986, Ser. No. 922,213

Int. Cl.[4] B65D *5/35*

U.S. Cl. 229—23 R **15 Claims**



1. A collapsible bulk shipping container comprising:

a tray-type bottom, said tray-type bottom having:

a rectangular bottom panel, said rectangular bottom panel having a first pair of opposed, spaced-apart edges and a second pair of opposed. spaced-apart edges, said second pair of opposed, spaced-apart edges extending transversely between said first pair of opposed, spaced-apart edges;

a first pair of panel means, one of said first pair of panel means being foldably attached to one of said first pair of opposed, spaced-apart edges of said rectangular bottom panel, at least a portion of said one of said first pair of panel means being foldable with respect to said rectangular bottom panel from a first position in which said at least a portion of said one of said first pair of panel means extends generally parallel to said rectangular bottom panel to a second position in which said at least a portion of said one of said first pair of panel means extends generally normally from said rectangular bottom panel, at least a portion of the other of said first pair of panel means being foldably attached to the other of said first pair of opposed, spaced-apart edges of said rectangular bottom panel, said at least a portion of said other of said first pair of panel means being foldable with respect to said rectangular bottom panel from a first position in which said at least a portion of said other of said first pair of panel means extends generally parllel to said rectangular bottom panel to a second position in which said at least a portion of said other of said first pair of panel means extends generally normally from said rectangular bottom panel;

a second pair of panel means, one of said second pair of panel means being foldably attached to one of said second pair of opposed, spaced-apart edges of said rectangular bottom panel, said one of said second pair of panel means being foldable with respect to said rectangular bottom panel from a first position in which said one of said second pair of panel means extends generally parallel to said rectangular bottom panel to a second position in which said one of said second pair of panel means extends generally normally from said rectangular bottom panel, the other of said second pair of panel means being foldably attached to the other of said second pair of opposed, spaced-apart edges of said rectangular bottom panel; and

an intermediate panel, said intermediate panel being directly foldably attached to said other of said second opposed, spaced-apart edges of said rectangular bottom panel, said other of said second pair of panel means being foldably attached to said other of said second pair of opposed, spaced-apart edges of said rectangular bottom panel by being foldably attached to said intermediate panel, said other of said second pair of panel means being foldably attached to said intermediate panel along a fold line which is spaced from and which extends generally parallel to said other of said second pair of opposed, spaced-apart edges of said rectangular bottom panel;

a collapsible three-sided structure which is partially telescopically disposed within said tray-type bottom and which is collapsible from a first, open configuration in which said collapsible three-sided structure has a generally U-shaped configuration to a second, collapsed configuration, said collapsible three-sided structure extending generally normally from said rectangular of said tray-type bottom when said collapsible three-sided structure is in said first, open configuration and extending generally parallel to said rectangular bottom panel of said tray-type bottom when said collapsible three-sided structure is in said second, collapsed configuration, the space between said fold line of said tray-type bottom and said other of said second pair of opposed, spaced-apart edges of said rectangular bottom panel being substantially at least as great as the thickness of said collapsible three-sided structure in its second collapsed configuration so that said collapsible three-sided structure, when in its second, collapsed configuration, will be contained within the outline of said intermediate panel, said collapsible three-sided structure further having:

a first side, said first side of said collapsible three-sided structure being disposed adjacent to, and being substantially coextensive with, said otherof said second pair of panel means of said tray-type bottom, said first side being secured to said otherof said second pair of panel means of said tray-type bottom; and

a pair of opposed sides, each of said pair of opposed sides being foldably attached to said first side, one of said pair of opposed sides being disposed adjacent to one of said first pair of panel means of said tray-type bottom when said collapsible three-sided structure is in said first, open configuration, the other of said pair of opposed sides being disposed adjacent to the other of said first pair of panel means of said tray-type bottom when said collapsible three-sided structure is in said first, open configuration, said collapsible three-sided structure further having vertical fold line means therein to permit said each of said pair of opposed sides to be folded inwardly about

said vertical fold line means toward the other of said pair of opposed sides upon the collapsing of said collapsible three-sided structure into said second, collapsed configuration; and

panel means which are separately telescopically insertable into, and which are removable from, said tray-type bottom, said panel means defining a tubular structure when said collapsible three-sided structure is in said first, open configuration and said panel means is telescoped into said tray-type bottom.

4,697,732

SEE-THRU METALLIC FOOD WRAPPER

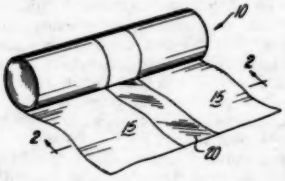
Mark Altus, Huntington Woods, Mich., assignor to The 2500 Corporation, Birmingham, Mich.

Continuation of Ser. No. 234,843, Feb. 17, 1981, Pat. No. 4,579,278, which is a continuation-in-part of Ser. No. 43,347, May 29, 1979, abandoned. This application Mar. 28, 1986, Ser. No. 845,502

The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.

Int. Cl.[4] B65D *65/00, 75/00*

U.S. Cl. 229—87 F **7 Claims**



1. A wrapping material including a plurality of alternating strips of metallic and transparent materials, said materials having a working temperature range of from at least −20° F. to 400° F., wherein said alternating strips are bonded together in an overlapping relationship about their common edge regions by a bonding material, said bonding material producing a joint having nontoxic properties throughout said temperature range.

4,697,733

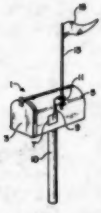
MAILBOX FLAG EXTENSION DEVICE

Donald W. Todd, 162 Zellers Rd., Long Valley, N.J. 07853

Filed Mar. 6, 1987, Ser. No. 22,405

Int. Cl.[4] B65D *91/00*

U.S. Cl. 232—34 **15 Claims**



1. In a rural mailbox having a staff and a solid flag which is rotatably located on the side of said mailbox and can be set in a horizontal or a vertical position, the improvement which comprises an extension signal device attached to said solid flag, said extension signal device comprising:

(a) a rod having an upper section and a lower section, with said lower section being threaded;

(b) a signal attached to the upper section of said rod; and,

(c) clamping member and a second clamping member, both being located at the lower section of said rod, said first clamping member extending from said rod and clamping over the top edge of said solid flag and said second clamping member being removably attached to said rod and extending from said rod and clamping over the bottom edge of said solid flag.

4,697,734

AIR-MIX DOOR CONTROL APPARATUS FOR AN AIR CONDITIONER FOR AUTOMOBILE

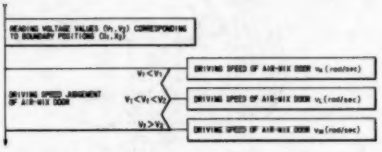
Toshiaki Ueda, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 20, 1986, Ser. No. 876,794

Claims priority, application Japan, Jul. 3, 1985, 60-144769

Int. Cl.[4] G05D *23/00*

U.S. Cl. 236—13 **6 Claims**


DRIVING SPEED ASSIGNMENT OF AIR-MIX DOOR
DRIVING SPEED OF AIR-MIX DOOR
DRIVING SPEED OF AIR-MIX DOOR
DRIVING SPEED OF AIR-MIX DOOR

1. In an air-mix door control apparatus of an air conditioner for automobile including: an air-mix door for adjusting a mixing ratio of heated air and cooled air; control means for calculating and outputting a control signal for an opening degree of said air-mix door in accordance with an operating condition of the air conditioner; a motor for driving said air-mix door in accordance with the opening degree control signal of said control means; and speed correction means for correcting the rotational speed of said air-mix door control motor in accordance with the opening position of said air-mix door.

4,697,735

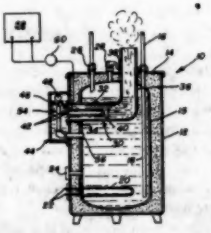
HUMIDIFYING HOT WATER HEATER

John Temple, 123 W. Second St., Chattanooga, Tenn. 37402

Filed Jun. 27, 1986, Ser. No. 879,488

Int. Cl.[4] F22B *1/28*

U.S. Cl. 236—44 C **14 Claims**



1. The combination of a hot water heater and a humidifier for adding moisture to the air in a building having a humidistat, said combination comprising a water tank supported in said building, said tank having a water inlet and an outlet for hot water, heating means for heating the water within the tank to a predetermined temperature and a pressure above ambient pressure and for maintaining the water in the tank substantially at said temperature, means for maintaining the pressure of the water in the tank above ambient pressure, a plenum chamber disposed within said tank, means for supplying a measured quantity of water from said tank to said plenum chamber, an outlet conduit communicating said plenum chamber with ambient air in said building, and means controlled by said humidi-

stat for adding energy to the water in the plenum chamber to agitate and remove water from said plenum chamber through said outlet conduit.

4,697,736

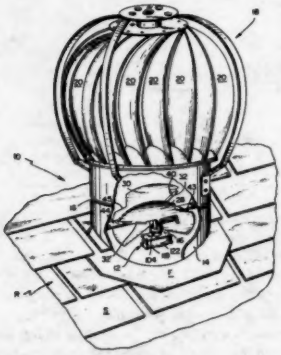
AUTOMATIC DAMPER ASSEMBLY

Stanley Kolt, Mamaroneck, N.Y., assignor to Leonard W. Surroff, Jericho, N.Y., a part interest

Continuation of Ser. No. 689,092, Jan. 7, 1985, Pat. No. 4,582,250, which is a continuation of Ser. No. 500,074, Jun. 1, 1983, abandoned. This application Mar. 25, 1986, Ser. No. 843,769

Int. Cl.[4] F24F *7/00*

U.S. Cl. 236—49 **2 Claims**



1. An automatic temperature responsive damper assembly for use within the conduit of a ventilating system designed to exhaust air from a defined space into the atmosphere comprising:

(a) mounting means for mounting said damper assembly within said conduit;

(b) at least one vane rotatably mounted on said mounting means, said vane being rotatable between a normally closed position wherein said vane substantially reduces the passage of air flow through said conduit and an open position wherein said vane increases the air flow through said conduit, said vane having;

(i) a pivotal axis disposed transverse to the axis of said condut,

(ii) a surface area including a larger first portion and a smaller second portion, said larger first portion extending beyond one side of said pivotal axis for biasing said vane to a closed position, said second portion extending beyond the other side of said pivotal axis, said second portion being adapted to cooperate with a first portion of a complementary vane to substantially reduce the air flow through said conduit,

(iii) an air flow path provided in said first vane portion for permitting a prescribed amount of said air to flow through said conduit when said vane is in said normally closed position, and

(iv) said vane first portion and said vane second portion being provided with inner edges and an outer edge, said inner edges being disposed at an angle from said pivotal axis of between 10 and 30 degrees, said outer edge substantially conforming to the shape of said conduit except for an opening through which said prescribed amount of air flows; and

(c) means for rotating said vane towards said open position when the temperature of the air in said defined space reaches a predetermined level.

4,697,737

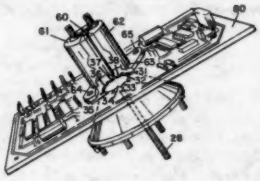
WIND CONTROLLED SPRAYING

George W. Pearce, 32 Monument St., Wenham, Mass. 01984

Continuation of Ser. No. 577,140, Feb. 6, 1984, abandoned. This application May 2, 1986, Ser. No. 860,691

Int. Cl.[4] A01G *27/00*

U.S. Cl. 239—67 **3 Claims**



1. Spraying apparatus for spraying into the air comprising:

wind sensing means for sensing wind from a predetermined plurality of directions at a predetermined location comprising a swinging contact,

electric circuit means, including a printed circuit board, said electric circuit means operatively connected to a spray means for intermittently initiating a spray into said air in response to movement of said swinging contact,

a plurality of fixed switch contact means formed on said printed circuit board for intermittent contact with said swinging contact, said fixed switch contact means being intermittently electrically connected to said swinging contact, causing said electric circuit means to initiate said spray into said air,

wherein said printed circuit board is formed with an aperture and said fixed contact means are formed by a plurality of fixed paths of conducting material along the side of the aperture and extending along top and bottom surfaces of said printed circuit board,

a housing above said printed circuit board and comprising means for protecting said fixed contact means from the elements,

said swinging contact having one end freely suspended from a conducting rod electrically connected to said electric circuit means and an opposite end intermittently in contact with said first contact means when moved by the wind,

said swinging contact passing through said circuit board aperture and free to engage any one of said fixed contact means without contacting another thereof,

and inwardly projecting fingers attached to said printed circuit board each between a pair of said fixed switch contact means comprising means for preventing said swinging contact from simultaneously contacting more than one of said fixed switch contact means and quickly shifting from one of said fixed switch contact means to another in response to small changes in wind direction,

thereby preventing electrical connection of said swinging contact simultaneously to more than one of said fixed switch contact means.

4,697,738

ELECTRICALLY ACTUATABLE FUEL-INJECTION VALVE FOR INTERNAL COMBUSTION ENGINES

Jürgen Lange, Eschborn, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed May 9, 1986, Ser. No. 861,482

Claims priority, application Fed. Rep. of Germany, May 13, 1985, 3517257

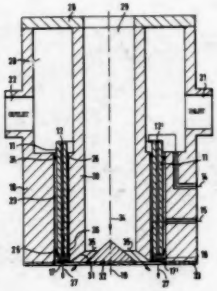
Int. Cl.[4] B05B *3/14, 15/00, 7/06*

U.S. Cl. 239—102.2 **6 Claims**

1. An electrically actuatable fuel-injection throttle for internal combustion engines comprising:

a piezoelectric hollow cylindrical radial vibrator, there being a plurality of fuel-receiving chambers disposed within a wall of the vibrator and arranged parallel and concentric to a longitudinal axis of the vibrator;

a fuel feed conduit, each of said chambers being in communication at one open end with said conduit;



an ejection opening disposed at the opposite open end of each of said chambers; and wherein

a passage bore for a stream of air extends through the radial vibrator concentric to its longitudinal axis, said bore having an open termination approximately at the height of the injection openings (holes).

4,697,739

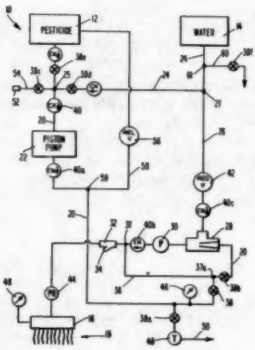
MICROTUBE APPLICATOR SYSTEM

Alan McCracken, Paoli, Pa.; Frank J. Dominiani, Jr., Flemington, and Edward A. DeJarnette, Jr., Plainsboro, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jul. 31, 1986, Ser. No. 895,416

Int. Cl.[4] B05B *1/20, 7/30;* **B67D** *5/52*

U.S. Cl. 239—127 **13 Claims**



1. A liquid agrichemical applicator system mountable on a farm vehicle and adapted for inline mixing and application of the liquid agrichemical to soil or crops in a continuous, diluted or undiluted, stream at low flow rate, comprising the combination of:

(a) a first, liquid agrichemical supply tank;

(b) a second, water supply tank;

(c) a manifold;

(d) a plurality of microtubes connected to the manifold for dispensing liquid agrichemical;

(e) a first liquid conduit connecting the first tank and the manifold;

(f) a first pump in the first liquid conduit;

(g) a second liquid conduit connecting the second tank and the first conduit upstream of the first pump;

(h) a third liquid conduit having one end connected to the second tank;

(i) means in the first conduit and connected to the other end of the third conduit for entraining water from the second tank;

(j) a second pump in the first conduit between the water entrainment means and the manifold;

(k) a fourth liquid conduit connected at both ends to the first conduit and arranged to bypass the water entrainment means and the second pump or to recirculate the liquid agrichemical to the water entrainment means and the second pump; and

(l) valve means in each of the first, second and third conduits adapted to control flow therethrough.

4,697,740

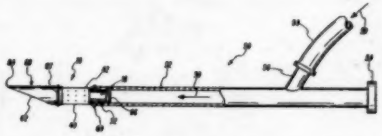
MIST GENERATOR WITH PIERCING MEMBER

Eugene W. Ivy, 3232 27th St., Port Arthur, Tex. 77642

Filed Dec. 5, 1985, Ser. No. 804,789

Int. Cl.[4] B05B *3/04, 3/06;* **A62C** *31/22*

U.S. Cl. 239—271 **7 Claims**



6. A fire fighting tool comprising, in combination:

a tubular shaft having first and second end portions and a sidewall enclosing a flow passage, a discharge port formed in one end of said tubular shaft, and an inlet port formed in said sidewall between said first and second shaft end portions for admitting pressurized water;

a water discharge nozzle assembly attached to said shaft in communication with the discharge port of said shaft, said water discharge nozzle having a rotary member for discharging water radialiy outwardly from said shaft;

piercing means connected to said nozzle assembly for penetrating a building structure and simultaneously inserting said nozzle assembly into the building structure;

an impact cap mounted on the opposite end of said shaft for transmitting a driving impact force from a sledge hammer or the like for causing said piercing means to penetrate a building structure; and,

expansion means carried by said shaft for enlarging an opening in a building structure or the like during foreceable penetration of said piercing means into or withdrawal from a building structure, said expansion means comprising a first annular ring formed on said piercing means at a location forward of said water discharge nozzle assembly, and a second annular ring formed into said tubular shaft at a position aft of said water discharge nozzle assembly.

4,697,741

ARRANGEMENT FOR QUICKLY CHANGING NOZZLES ON A SPRAYING APPARATUS

Alfred Dengler, Deckenpfronn, and Eberhard Medler, Sindelfingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 18, 1984, Ser. No. 662,161

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1983, 3337980

Int. Cl.[4] B05B *13/06*

U.S. Cl. 239—391 **13 Claims**

1. A spraying arrangement for accommodating spraying of a

variety of surfaces having different geometric shape configurations utilizing a plurality of differently configured spraying nozzle means and a common spray medium supply line comprising:

movable nozzle holder means capable of being selectively coupled with one of said nozzle means, said nozzle holder means being fluidly communicable with a source of fluid spray medium,

quick change coupling means for fluidly and mechanically coupling said movable nozzle holder means with said one nozzle means, said coupling means comprising a first portion on said nozzle holder means and a second portion on said nozzle means, and

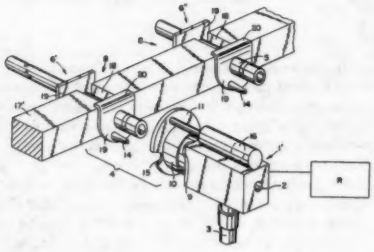
nozzle retainer means for holding said nozzle means in a fixed position, said one nozzle means being capable of being removed from said nozzle retainer means after coupling with said nozzle holder means,

wherein said retainer means prevent radial and axial displacement of said nozzle means,

wherein said retainer means prevent rotational displacement of said nozzle means,

including depositing means provided on said nozzle holder means for depositing said nozzle means in said retainer means,

wherein said depositing means comprises depositing tongue means extending below said spraying nozzle means.



8. A spraying arrangement for accommodating spraying of a variety of surfaces having different geometric shape configurations utilizing a plurality of differently configured spraying nozzle means and a common spray medium supply line comprising:

movable nozzle holder means capable of being selectively coupled with one of said nozzle means, said nozzle holder means being fluidly communicable with a source of fluid spray medium,

quick change coupling means for fluidly and mechanically coupling said movable nozzle holder means with said one nozzle means, said coupling means comprising a first portion on said nozzle holder means and a second portion on said nozzle means, and

nozzle retainer means for holding said nozzle means in a fixed position, said one nozzle means being capable of being removed from said nozzle retainer means after coupling with said nozzle holder means,

said quick-change coupling means comprises an axially displaceable sleeve means connected to said nozzle holder means,

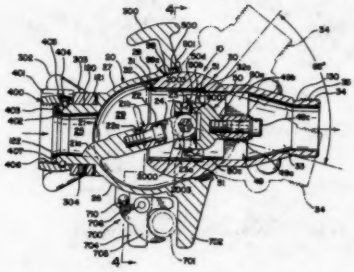
including piston means mounted in said nozzle holder means, said piston means being directly attached to said axially displaceable sleeve means for axially displacing said sleeve means.

4,697,742

ADJUSTABLE AND SECURABLE FLUID PIPE JOINT AND NOZZLE COUPLING UNIT

Dennis E. Schnipke, Wooster, Ohio, assignor to Premier Industrial Corporation, Cleveland, Ohio

Filed Apr. 15, 1985, Ser. No. 723,187
Int. Cl.[4] B05B *15/08*
U.S. Cl. 239—587 **19 Claims**



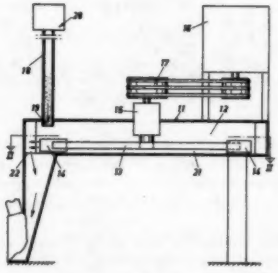
17. A fluid coupling comprising: cooperating ball and socket members having fluid flow passages therethrough, said ball member being recieved in said socket member with said fluid flow passages therein communicating with one another, means connecting said ball and socket members for substantially universal pivotal movement relative to one another, seal means interposed between said ball and socket members for sealing same against leakage of fluid from said fluid flow passages, one side of said seal means being subjected to pressure of fluid flowing through said fluid flow passages and the opposite side of said seal means being exposed to atmospheric pressure, and selectively operable brake means cooperatively interposed between said ball and socket members on said opposite side of said seal means for selectively securing said ball and socket members against movement relative to one another.

4,697,743

METHOD OF FINELY CRUSHING PARTICLES OF MATERIAL IN AN IMPACT MILL AND APPARATUS FOR PERFORMING THE METHOD

Conny Björck, Västra Frölunda, and Per A. Sigurdsson, Askloster, both of Sweden, assignors to Sicomant AB Juteskarsgatan 38, Vastra Frolunda, Sweden

Continuation-in-part of Ser. No. 453,897, Dec. 13, 1982, abandoned. This application Nov. 30, 1984, Ser. No. 676,885
Int. Cl.[4] B02C *13/14, 19/00*
U.S. Cl. 241—5 **18 Claims**



1. A method for producing pulverized materials by comminuting particles of the material comprising:

rotating at least one substantially vertical impact surface

located at the peripheral end of a rotor in a closed path about an upstanding axis;

repeatedly moving said at least one impact surface through at least one impact position in said path at the peripheral end of said rotor;

feeding the particles of material to be comminuted in an axial direction downwardly with respect to said rotor just opposite the peripheral end thereof to supply said at least one impact position with particles when said at least one vertical impact surface passes through said at least one impact position;

evacuating and maintaining said path and said feeding and impact areas under a substantial vacuum;

accelerating the particles in the vacuum during the feeding step downwardly towards said at least one impact position;

impacting said accelerated particles in said at least one impact position with sufficient energy to crush them and produce fragments;

projecting the fragments by the impact surface against stationary, vertical impact surfaces outside said path to produce further crushing; and

leading the comminuted particles downwardly out of said path immediately after said further crushing on said stationary impact surfaces.

4,697,744

PROCESS FOR THE PRODUCTION OF IRON OXIDE FINE POWDER

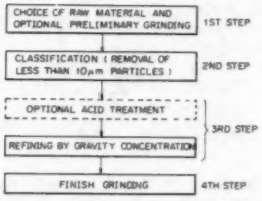
Minoru Wada, Ibaraki; Chikara Hidaka, and Takeshi Noma, both of Mobara, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Oct. 9, 1985, Ser. No. 785,615

Claims priority, application Japan, Oct. 16, 1984, 59-216566; Mar. 11, 1985, 60-047946; Aug. 7, 1985, 60-173909

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—20 **24 Claims**



1. A process for producing iron oxide fine powder of high purity from an oxide iron ore, comprising the steps of:

(a) providing as a raw material an oxide iron ore or a mixture thereof in the form of preliminarily ground powder in which the total amount of metal oxide impurities having a specific gravity between 4.5 and 5.5 and/or being capable of forming an iron compound with an iron oxide present in the raw material is not greater than 1.5% by weight based on the total weight of iron oxides present therein;

(b) subjecting the iron ore powder to classification under such conditions that fine particles smaller than 10 μm in diameter are removed from the ore powder;

(c) refining the ore powder by means of gravity concentration; and

(d) finish grinding the refined powder to reduce the particle size to a desired level.

4,697,745

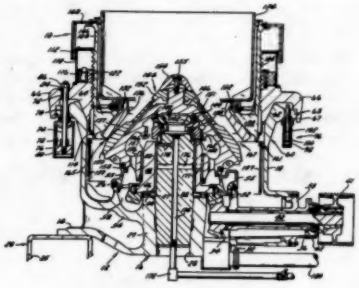
METHOD AND APPARATUS FOR HIGH PERFORMANCE CONICAL CRUSHING

Ulhas S. Sawant, Sussex; Vijia K. Karra, Greendale, and Dean M. Kaja, Germantown, all of Wis., assignors to Rexnord Inc., Brookfield, Wis.

Filed Feb. 24, 1986, Ser. No. 832,917

Int. Cl.[4] B02C *2/04, 19/00*

U.S. Cl. 241—30 **18 Claims**



1. A method for increasing the productivity of a conical crusher for communiting a volume of material over unit time, said crusher having a fixed outer configuration, a fixed bowl liner having a maximum diameter, a specific volumetric capacity, a conical head with a specified diameter and gyrating within said bowl liner at a specified throw, said head also having a specified gyrational speed and power draw, and said crusher having a specified setting or gap between said bowl liner and said head, with the crushing action taking place when the gyrating head moves toward the bowl liner, said method comprising:

increasing said throw of said head over the specified throw; and

increasing said gyrational speed over the specified speed.

4,697,746

GRINDER PUMP

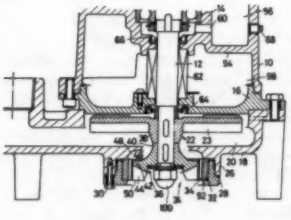
Shinji Nishimori, Tokyo, Japan, assignor to Ebara Corporation, Tokyo, Japan

Filed Aug. 15, 1985, Ser. No. 765,941

Claims priority, application Japan, Aug. 17, 1984, 59-124684[U]

Int. Cl.[4] B02L *23/36*

U.S. Cl. 241—46 B **6 Claims**



1. A grinder pump comprising:

a pump casing;

a volute chamber defined in said pump casing, said volute chamber having a suction port;

a pump shaft extending through said pump casing;

a pump impeller fitted on said pump shaft for rotation therewith and positioned in said volute chamber;

a grinder ring having an outer radial periphery provided around said suction port of said volute chamber;

a grinder impeller mounted on said pump shaft for rotation therewith such that the periphery thereof rotates along the inner periphery of said grinder ring; and

an annular suction cover in which said grinder ring is held, said annular suction cover being detachably mounted in said pump casing so as to surround said suction port, wherein said grinder ring is attached to said pump casing via said suction cover and is fitted and radially held within said suction cover with substantially no radial contact between said outer periphery of said grinder ring and said pump casing.

4,697,747

TUBE MILL

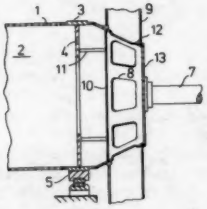
Ib V. Trelby, Copenhagen, Denmark, assignor to F. L. Smidth & Co. A/S, Copenhagen, Denmark

Filed Nov. 8, 1985, Ser. No. 796,636

Claims priority, application United Kingdom, Dec. 4, 1984, 8430514

Int. Cl.⁴ B02C *17/24*

U.S. Cl. 241—54 **3 Claims**



1. In a gas swept tube mill for grinding particulate material, said mill comprising a cylindrical mill shell having, at an outlet end thereof, a ring, which is reinforced inside said mill shell by an annular stiffening web plate, and by which ring the mill is supported on at least one bearing; a connecting section connecting the mill shell with a drive shaft which is coaxial, with and is adapted to transmit rotation to, said mill shell, said connecting section being provided with openings for the discharge of ground material and gas, the improvement wherein said connecting section is a frustoconical drum with opposed larger and smaller diameter ends, said larger diameter end having substantially the same diameter as that of said mill shell; means fastening said larger diameter end to said mill shell and means connecting said smaller diameter end to said drive shaft, and a sieve plate mounted downstream of said stiffening web plate.

4,697,748

METHOD AND APPARATUS FOR MACERATING AND WET-CRUSHING BREWING INGREDIENTS

Martin Widhopf, Freising, Fed. Rep. of Germany, assignor to Firma Steinecker Maschinefabrik GmbH, Freising, Fed. Rep. of Germany

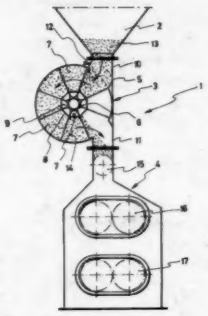
Filed May 1, 1986, Ser. No. 857,946

Claims priority, application Fed. Rep. of Germany, May 2, 1985, 3515816

Int. Cl.⁴ B02C *23/18*

U.S. Cl. 241—62 **5 Claims**

1. Apparatus for macerating and wet-crushing brewing ingredients, comprising a supply container, a housing connected thereto in vertical alignment and containing a rotatable metering and macerating drum formed with radially outwardly opening macerating chambers, and a wet crushing mill disposed below said metering and macerating drum, characterized in that the size of said macerating chambers (7) of said metering and macerating drum (6) and the rotational speed thereof are relatively selected so as to carry out the complete macerating process within said metering and macerating drum



(6), and said wet crushing mill (4) immediately succeeds said metering and macerating drum (6).

4,697,749

COMBINATION CONDIMENT GRINDER AND DISPENSER

David A. Holcomb, and James A. Tryon, both of Seattle, Wash., assignors to F. Bartow Fite, Seattle, Wash.

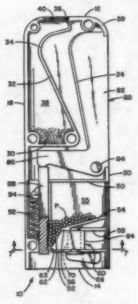
Division of Ser. No. 738,827, May 29, 1985, Pat. No. 4,573,244.

This application Oct. 29, 1985, Ser. No. 792,455

The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.

Int. Cl.⁴ A47J *42/34*

U.S. Cl. 241—169 **18 Claims**



1. An adjustable condiment grinding device for a hand-held condiment grinder, comprising:

a first member having a condiment gripping surface, said gripping surface having a discharge end;

a second member having a sloped surface converging toward said discharge end of said first member;

a sharp-cornered edge at the termination of the sloped surface of the second member adjacent the discharge end of the first member and extending outwardly from said second member toward said first member beyond the plane of the sloped surface of the second member;

means for reciprocating one of said members relative to the other member along a first path for grinding condiment between said gripping surface and said sharp-cornered edge; and

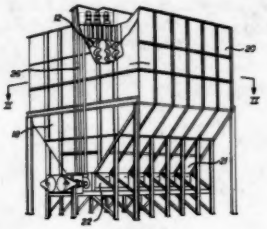
means for adjusting the position of one of said members relative to the other member in a direction perpendicular to said first path.

4,697,750

LIVE CENTER BIN MODIFICATION

Stanley R. Prew, Montoursville, Pa., assignor to SWM Corporation, Windsor, Conn.

Filed Sep. 4, 1985, Ser. No. 772,498
Int. Cl.[4] B02C *19/22*
U.S. Cl. 241—247 12 Claims



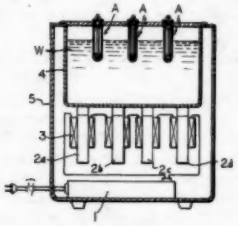
1. An apparatus for discharging plug flow material comprising a bin having vertically opposed first and second end walls and side walls interposed between said end walls as downwardly and inwardly sloping side walls to be spaced at their lower ends to form a lower elongated discharge aperture; first and second vertical discharge screws each having a sloping screw flight and adapted for rotation about their vertical axes, said screws being positioned, respectively, adjacent said first and second end walls, the second vertical screw having a direction of rotation opposite to the direction of rotation of the first vertical screw and having a screw flight with its slope being the negative reciprocal of the slope of the screw flight of the first vertical screw whereby an upward conveyance of material is established therebetween upon rotation of the vertical screws; and first and second shroud means interposed respectively between the first vertical end wall and the first vertical screw and the second vertical screw and second vertical end wall such that wedging of the plug flow material between said vertical screws and said end walls is avoided.

4,697,751

ULTRASONIC DISINTEGRATING APPARATUS

Sigeru Chiba, 1-8-9 Inamuragasaki, Kanagawa prefecture, Japan

PCT No. PCT/JP83/00427, § 371 Date Jan. 7, 1985, § 102(e) Date Jan. 7, 1985, PCT Pub. No. WO84/02350, PCT Pub. Date Jun. 21, 1984
PCT Filed Dec. 5, 1983, Ser. No. 695,455
Claims priority, application Japan, Dec. 6, 1982, 57-184536[U]
Int. Cl.[4] B02C *19/18*
U.S. Cl. 241—301 1 Claim



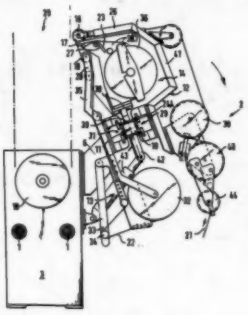
1. An ultrasonic disintegrating apparatus comprising:
a tank adapted for containing a liquid;
ultrasonic wave generating means operatively coupled to a bottom wall of said tank;
at least one vessel adapted for containing a solution of cells to be disintegrated, each said vessel being vertically immersed in liquid in said tank such that ultrasonic waves propagated from said bottom wall disintegrate said cells in each said vessel, each said vessel including a cylindrical metallic tube, said tube having an open upper end and a closed lower end for receiving said cells, a cap including a portion adapted to extend inwardly of said metallic tube and having an O-ring mounted on the outer periphery thereof so as to closely engage the inner peripheral surface of said metallic tube whereby said cap is detachably mounted to the upper end of said tube, and a metallic bar coupled at one end thereof to said cap and suspended therefrom such that the other end of said metallic bar terminates at a point spaced from the lower end of said metallic tube for facilitating the disintegration of material within said tube.

4,697,752

COIL WINDING MACHINE

Otto Graul, Bamberg, and Herbert Oppelt, Frensdorf, both of Fed. Rep. of Germany, assignors to MWB Messwandler-Bau Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 26, 1985, Ser. No. 760,044
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1984, 8423162[U]
Int. Cl.[4] B65H *81/06*
U.S. Cl. 242—7.11 19 Claims



1. A coil winding machine comprising:
support means;
clamping and rotating means for clamping and rotating a coil about a horizontal axis of rotation of said support means;
a common bearer means pivotally mounted to said support means about an axis disposed to the rear of the axis of rotation of the coil;
a plurality of winding material feed means mounted to said common bearer means to rotate therewith, and each including a supply means and at least one guide roller means;
means for defining for said common bearer means a winding position extending sid guide roller means in a space vertically about said coil and a retracted position removing said guide roller means and any supply means in said space vertically above said coil out of the space vertically above the coil so that the coil can be removed vertically upwardly.

4,697,753
STEPPED PRECISION WINDING PROCESS

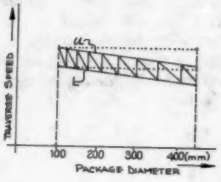
Heinz Schippers; Seigmar Gerhartz, both of Remscheid, and Rolf Kalthoff, Wermelskirchen, all of Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

Filed Mar. 11, 1986, Ser. No. 838,390

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1985, 3508554; Aug. 14, 1985, 3529117

Int. Cl.[4] B65H *54/38*

U.S. Cl. 242—18.1 8 Claims



1. A method of winding a textile yarn into a core supported package and comprising the steps of winding the yarn about the core at a substantially constant rate and such that the rotational speed of the package gradually decreases, while guiding the yarn onto the core by a traversing yarn guide, decreasing the speed of the traversing yarn guide in proportion to the decreasing rotational speed of the package to define a substantially constant winding ratio during each of a series of sequential steps of the winding cycle, rapidly increasing the speed of the yarn traversing guide at the beginning of each sequential step to produce a stepped precision wind and so as to define upper and lower limits of the yarn traversing speed during each sequential step, and changing the upper and lower limits of the yarn traversing speed in the same direction of change during at least a portion of the winding cycle.

4,697,754
TOILET ROLL HOLDER AND DISPENSER

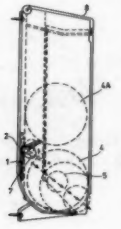
Kenneth S. Duff, Blenheim, New Zealand, assignor to Durolla Products (N.Z.) Limited, Auckland, New Zealand

Filed Apr. 29, 1985, Ser. No. 728,529

Claims priority, application New Zealand, Apr. 27, 1984, 207976

Int. Cl.[4] B65H *19/04*

U.S. Cl. 242—55.3 4 Claims



1. A roll holder comprising a container for rolls of web material, the container being in the form an elongated box-like formation having two ends, a loading aperture at one end through which a plurality of rolls can be successively inserted into the interior of the container, the other end being formed to support a lowermost one of the rolls when the container is oriented to have its longitudinal axis substantially vertical, and a withdrawal aperture adjacent the other end of the container to enable a web of material to be withdrawn from the lowermost roll, the container including internal impeding means for impeding the passage of successive rolls through the container towards said other end, the impeding means comprising a pivot member mounted for pivoting about a pivot axis substantially parallel to respective axes of the rolls received within the container, the impeding means being so arranged that when the lowermost roll is in a dispensing condition, the pivot member is pivoted to impede downward progress of a succceeding roll, but when the lower most roll has been finished, the impeding means will upon its pivotal movement allow the succeeding roll to move into dispensing position in place of the lowermost roll, and wherein there is provided manually actuable means for manipulating the impeding means after depletion of the lowermost roll so as to allow the succeeding roll to assume the dispensing position, the manually actuable means being disposed wholly within the interior of the container for manual operation thereof by insertion of a user's finger through the withdrawl aperture only when the lowermost roll has been finished and removed.

4,697,755
REWINDER WITH SLITTER

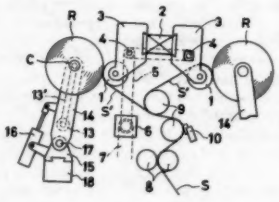
Hiroshi Kataoka, 3686, Sangawacho, Iyomishima-shi, Ehime 799-04, Japan

Filed Aug. 27, 1985, Ser. No. 769,733

Claims priority, application Japan, Aug. 27, 1984, 59-176567; Dec. 27, 1984, 59-273794

Int. Cl.[4] B65H *18/10, 18/16, 35/02*

U.S. Cl. 242—56.4 9 Claims



1. A rewinder with a slitter in which a striplike sheet is unwound by an unwinding roller and slit into a plurality of slit sheets which are distributed to winding axles rotated at first and second winding positions along a base mount extending in the width direction of the unwound sheet, said winding axles are driven for rewinding by drive means capable of torque adjustment in contact with touch rollers which are driven with the torque of a motor driving said unwinding roller transmitted through a finely adjustable speed change mechanism, comprising:

a pair of support frames provided for each predetermined slit sheet winding position and having one end slidably engaged with said base mount and the other end provided with support means for detachably supporting a touch roller;

touch rollers each supported by said support means of said support frames and in contact with the outer periphery of a sheet roll being formed on the winding axle;

a screw shaft extending along said base mount and penetrating said support frames for driving said touch roller;

torque transmitting means provided on one of said support frames and having one end connected to said screw shaft and the other end connected to said touch roller;

a driving axle extending along said base mount and penetrating said support frames for moving said support frames in the width direction of the sheet;

a female screw rotatably penetrating and supported in said support frame and screwed on said driving axle; and

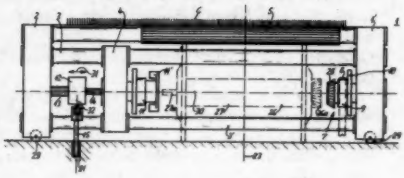
engaging means provided on said support frame and engaging with said female screw.

4,697,756

WINDING MACHINE FOR WINDING AND/OR UNWINDING WEB-LIKE GUIDED MATERIALS

Wilhelm Kofler, Uzwil, Switzerland, assignor to Benninger AG, Uzwil, Switzerland

Filed Sep. 9, 1985, Ser. No. 774,004
Claims priority, application Switzerland, Sep. 11, 1984, 4321/84
Int. Cl.[4] B65H *18/04, 18/10, 54/553*
U.S. Cl. 242—67.1 R 15 Claims



1. A winding machine for winding and unwinding a web-like guided material, comprising:

a driven first beam chucking device;

a rotatable second beam chucking device;

a lateral drive frame for carrying said driven first beam chucking device;

an auxiliary side frame;

a longitudinal displaceable support situated between said lateral drive frame and said auxiliary side frame for carrying said second beam chucking device;

the winding machine having a predetermined direction of winding;

a rolling device comprising first and second roller means and enabling the winding machine to move in a direction transverse to said predetermined direction of winding;

said first roller means being operatively associated with said lateral drive frame and said second roller means with said auxiliary side frame;

a displacement device arranged between said auxiliary side frame and said displaceable support and defining a direction of displacement of the winding machine;

said displacement device comprising at least one first extension link connected with said auxiliary side frame and at least one second extension link connected with said displaceable support;

said first and second extension links being positively moveable in opposite directions each by equal amounts relative to a spatially fixed plane passing through said displacement device transversely to said direction of displacement;

the winding machine having a predetermined winding axis;

said first and second extension links each defining respective displacement axes thereof along which said first and second extension links are displaceable;

said displacement axes substantially coinciding with said predetermined winding axis of the winding machine; and

said displacement axes of said first and second extension links lying substantially parallel to said predetermined winding axis of the winding machine and passing through a centroid of stress which results from friction reaction forces of said displaceable support and a beam chucking force.

4,697,757

SLEEVE TO BE ATTACHED TO THE REEL ON A WINDING OR REWINDING MACHINE

Tsutomu Nakaya, Kisarazushi, and Masayoshi Maruyama, Kimitsushi, both of Japan, assignors to Okashiro Sangyo Kabushiki Kaisha, Fukuokashi, Japan

Filed Mar. 10, 1986, Ser. No. 837,959
Int. Cl.[4] B65H *75/02*
U.S. Cl. 242—68.5 9 Claims

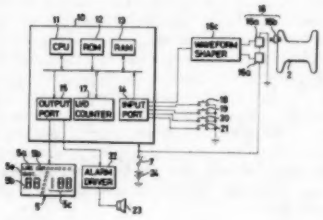
1. In a winding or rewinding machine, a rotatable reel element having a periphery, a sleeve member located on said periphery, said sleeve member comprising at least two layers, at least one of said layers comprising a high-strength elastic resin and an outermost of said layers being formed of leather.

4,697,758

FISHING REEL WITH MICROCOMPUTER

Haruomi Hirose, and Takashi Atobe, both of Tokyo, Japan, assignors to Daiwa Seiko, Inc., Tokyo, Japan

Filed May 14, 1985, Ser. No. 733,895
Claims priority, application Japan, May 21, 1984, 59-102002; May 21, 1984, 59-102003; May 21, 1984, 59-102004; May 21, 1984, 59-102005
Int. Cl.[4] A01K *89/015*
U.S. Cl. 242—84.1 M 7 Claims



1. A reel for fishing, comprising:

a reel body;

a spool which is rotatably held to the reel body and on which a fishing line is wound;

sensor means for detecting the rotation of the spool and for providing pulse-form signals having a repetition frequency proportional to the rotational frequency of the spool;

a microcomputer, including an up/down counter which is incremented by said signals from the sensor means to count the number of revolutions made by the spool when the fishing line is paid out, the counter being also selectively capable of being decremented by said signals from the sensor means;

the microcomputer including CPU means for calculating the length of the paid out portion and the length of the wound portion of the fishing line from the total count obtained by the counter according to a selected stored nonlinear formula for calculating length of line as a function of the number of revolutions made by the spool;

a display unit driven by the microcomputer for displaying the calculated lengths;

the microcomputer including a memory for storing a plurality of different such formulas corresponding to various possible diameters of lines;

line diameter selective input means for selecting for use by the CPU means one of said formulas corresponding to the diameter of the line wound on the spool; and

means for resetting the value displayed on the display unit to zero when the paid out portion of the fishing line if completely wound up on the spool;

4,697,759

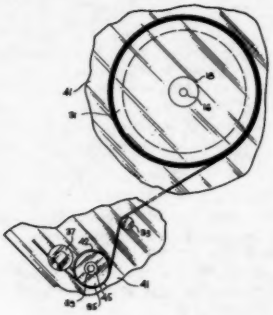
REEL FOR ALIGNING TAPE PATH

James J. Henderson, and Chester W. Newell, both of San Jose, Calif., assignors to Cartrex, Grand Rapids, Mich.

Filed May 5, 1986, Ser. No. 859,632

Int. Cl.[4] G03B *1/04;* G11B *15/32*

U.S. Cl. 242—179 **7 Claims**



1. Apparatus for stabilizing a tape path comprising,

a tape reel having a central hub defining an axial passageway therethrough, a body portion surrounding the hub having an outer, peripheral, cylindrical, tape support surface with a dimension corresponding to a tape width, and an annular outrigger coaxial with said hub and extending below said body portion, said annular outrigger being spaced apart from the hub and from said outer peripheral surface,

a planar base with an upright pin therein, the axial passageway of said hub fitting closely over the pin in a wheel and axle relation, the annular outrigger contacting the base,

means associated with said pin for urging said annular outrigger to remain in contact with the base as said reel rotates, and

a crown pulley with a symmetrical arcuate profile somewhat wider than said tape width and mounted for rotation on said base to receive tape from the reel, said pulley spaced apart from said reel and having an axis about which the pulley turns, the pulley being adapted for up and down axial motion on said axis, whereby said annular outrigger constrains said reel to urge a moving tape toward said crown pulley, thus stabilizing the axial motion of tape along its path, without excessive edge guide contact therewith.

4,697,760

CLUTCH MECHANISM FOR USE IN FISHING REELS

Atsuhito Aoki, Fuchu, Japan, assignor to Ryobi Limited, Hiroshima, Japan

Filed Jan. 21, 1986, Ser. No. 820,566

Claims priority, application Japan, Jan. 21, 1985, 60-7029[U]

Int. Cl.[4] A01K *89/015*

U.S. Cl. 242—220 **8 Claims**

1. A clutch mechanism for use in a fishing reel comprising:

a support;

a spool shaft mounted on said support and connected to a spool on which fishing line is stored;

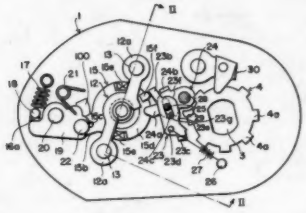
a pinion movably coupled to said support and engageable with said spool shaft;

operating means for, in an ON state, engaging said pinion with said spool shaft to drivingly couple a handle with said spool and for, in an OFF state, disengaging said pinion from said spool shaft to enable pay-out of the fishing line from said spool; said operating means comprising:

(a) a clutch cam means including means for mounting the clutch cam means for rotation on said support, said clutch cam means having an ON state position and an OFF state position, wherein said clutch cam means moves the pinion between engagement and disengagement with the spool shaft as the clutch cam means rotates between its ON and OFF state positions, respectively, said clutch cam means including a contact portion;

(b) a ratchet wheel rotatably mounted on said support and connected to said handle;

(c) operating lever means including mounting means for mounting said operating lever means on said support for rotational and linear movement thereon and having a first position thereof engageable with said contact portion of the clutch cam means, and having a second portion thereof engageable with said ratchet wheel, said linear movement of the operating lever means being along a given line which is substantially tangent to a rotary locus of the clutch cam means and to a rotary locus of the ratchet wheel; and



(d) spring means mounted on said support for biasing said operating lever means toward engagement with said ratchet wheel, the contact portion of the clutch cam means, in its ON state, urging the first portion of the operating lever means against the bias applied by said spring means to maintain the second portion of the operating lever means out of engagement with said ratchet wheel, the clutch cam means, upon being rotated from its ON to its OFF state position, enabling the spring means to move the operating lever means to bring the second portion of the operating lever means into position between adjoining teeth of the ratchet wheel; and

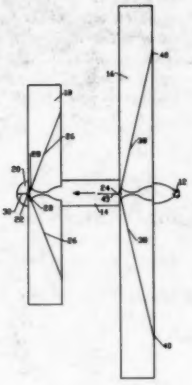
motion transmitting means on the clutch cam means and the operating lever means responsive to force applied by a ratchet wheel tooth to the second portion of the operating lever means, upon rotation of the ratchet wheel by the handle in a direction to wind the fishing line onto the spool, for converting motion of said operating lever means along said given line into rotation of the clutch cam means from its OFF to its ON state position and, with such rotation of the clutch cam means, rotating the operating lever means to disengage the second portion of the operating lever means from said ratchet wheel as the contact portion of the clutch cam means urges the first portion of the operating lever means against the bias applied by the spring means.

4,697,761

HIGH ALTITUDE RECONNAISSANCE PLATFORM

David E. Long, 6666 Glade Ave., Apt. 217, Canoga Park, Calif. 91303

Filed Sep. 16, 1985, Ser. No. 776,425
Int. Cl.[4] B64D 27/24
U.S. Cl. 244—62 17 Claims



1. A high altitude, ultralight aircraft requiring no fuel comprising:

an aircraft having wings with broad area upper and lower wing surfaces,

a low speed propellor mounted on said aircraft;

electric motor means mounted on said aircraft and coupled to drive said propellor;

solar cell means for receiving solar energy and supplying electricity to power said motor means, said solar cell means being mounted on the upper surfaces of said wings;

long wavelength infrared (LWIR) responsive cell means for receiving albedo infrared energy from the earth and for supplying electricity to power said motor means, said LWIR cell means being mounted on the lower surfaces of said wings; and

means for storing excess electrical energy supplied by said solar and LWIR cell means beyond that needed for powering said motor means, and for supplying supplemental electrical power to said motor means when the power supplied from said cell means is inadequate;

whereby the aircraft may have a life at elevated altitudes of several years.

4,697,762

INFLATABLE FLOAT ASSEMBLY AND UNDERCARRIAGE FOR AIRCRAFT

Donald B. Arney, 1001 - 2191 West 39th Avenue, Vancouver, British Columbia, Canada (V6M 1T7)

Filed Jan. 28, 1986, Ser. No. 823,373
Claims priority, application Canada, Jan. 31, 1985, 473334
Int. Cl.[4] B64C 25/56
U.S. Cl. 244—101 21 Claims

1. An inflatable float assembly for an aircraft having:

(a) a flexible, tough, outer fabric tubular shell having elongated upper and lower walls interconnected by spaced first and second elongated side walls to form an elongated generally tubular float having an interior,

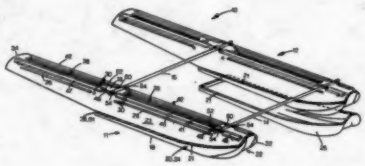
(b) the lower wall of the float having a transversely extending step and forward and aft portions, the forward and aft portions being spaced vertically apart adjacent lower and upper transverse edges respectively of the step,

(c) the upper wall of the float having a first elongated sleeve means extending longitudinally therealong,

(d) a first elongated stiffening member extending longitudinally through the first sleeve means, the stiffening member being adapted to cooperate with the aircraft,

(e) a plurality of baffles extending between at least one pair of oppositely spaced apart walls, so as to form a plurality of compartments within the interior of the float, the baffles including at least one transverse baffle located above and generally adjacent the step so as to divide the interior of the float into foward and aft compartments,

(f) a plurality of inflatable airtight bladders, one bladder



being fitted within each compartment of the float so that when the bladders are fully inflated with gas, the float assumes an essentially rigid form, the said transverse baffle controlling location of ends of bladders generally adjacent the step,

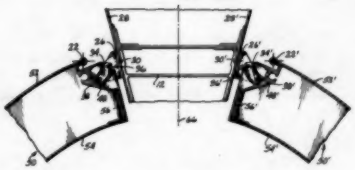
(g) stiffening means extending forwardly from the lower transverse edge of the step along an aft portion of the forward lower wall of the float, so that the step has a relatively well defined lower corner so as to improve efficiency of planing and rotation of the float for take-off.

4,697,763

HINGE SYSTEM FOR THRUST REVERSER COWL

Michael L. Vermilye, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 31, 1985, Ser. No. 793,571
Int. Cl.[4] B64C 1/14
U.S. Cl. 244—129.4 11 Claims



1. In an aircraft having at least one engine mounted on an engine mounting strut, said engine including a thrust reverser cowl, said cowl being divided into two cowl halves, a mounting system for pivotally attaching said cowl halves to said engine mounting strut for movement of said cowl halves between a closed position in which said cowl halves envelop said engine and an open position in which said cowl halves are spaced from said engine, said mounting system including:

first and second hinge cooperatively mounted on said cowl and said strut, said first and second hinges defining a hinge line;

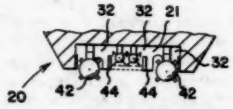
load transfer means cooperatively mounted on said strut and at least one of said cowl halves offset from said hinge line, said load transfer means including a first portion mounted on said cowl half and a second portion affixed to said strut, said first and second portions being in cooperative engagement when said cowl half is in its closed position for bearing a portion of the load of said cowl and disengaged when said cowl is in the open position.

4,697,764

AIRCRAFT AUTONOMOUS RECONFIGURABLE INTERNAL WEAPONS BAY FOR LOADING, CARRYING AND LAUNCHING DIFFERENT WEAPONS THEREFROM

Richard Hardy, Seattle; Frank D. Neumann, Bellevue, and Dennis E. Ruzicka, Enumclaw, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 18, 1986, Ser. No. 830,007
Int. Cl.[4] B64D 1/06, 7/08
U.S. Cl. 244—137.4 9 Claims



1. An aircraft internal weapons bay, the bay reconfigurable for loading, carrying and launching different types of weapons, such as air-to-air and air-to-ground weapons, the bay comprising:

a bay housing for receiving weapons therein;

a plurality of folding doors attached to the housing, the doors when in an open position being received entirely inside the housing and dividing the housing along its length into individual compartments, said doors, when in a closed position, enclosing said housing and allowing free access between adjacent individual compartments so that said individual compartments form a single unitary compartment; and

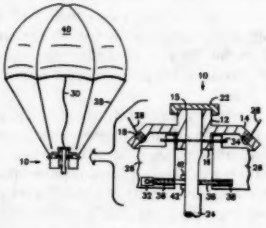
a plurality of launchers attached to the bay housing and positioned in respective individual compartments, said launchers ejecting any weapons carried by said launchers from said individual compartments when the doors are opened.

4,697,765

PARACHUTE REEFING/RELEASE DEVICE

Martin A. Wimmer, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 21, 1986, Ser. No. 887,764
Int. Cl.[4] B64D 17/38
U.S. Cl. 244—152 2 Claims



1. A parachute reefing/release device comprising:

a reefer having a plurality of severable sections;

releasable means for holding said sections of said reefer together until such time as reefing/release action is desired, said releasable means having a safe position, an actuated position, and release of said reefer;

force actuating means connected to said releasable means and said reefer for holding said releasable means in the safe position and allowing said releasable means to move to the actuated position upon the application of a predetermined force to said reefer; and

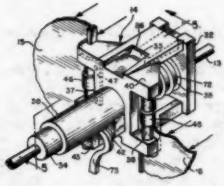
means mounted adjacent said releasable means for initiating release of said releasable means when said releasable means is in the actuated position and a signal is supplied thereto.

4,697,766

DEVICE FOR ASCENDING AND DESCENDING A KITE STRING

Gerd O. Stritzke, Rock Lake, Highway O, Winchester, Wis. 54567

Filed Jan. 21, 1986, Ser. No. 821,152
Int. Cl.[4] B64C 31/06
U.S. Cl. 244—155 R 18 Claims



1. A device for ascending a string toward a kite and subsequently descending the string comprising:

housing means with a longitudinal axis generally parallel to the kite string and an elongate aperture through the housing means and arranged generally parallel to the longitudinal axis;

a first and second wing each hingedly attached to the housing means and each being adapted to pivot between an ascending position generally transverse to the longitudinal axis of the device, and a descending position generally parallel to the longitudinal axis and toward the kite;

trigger means for releasably retaining each wing in its ascending position comprising an elongate portion inserted within the aperture of the housing means and adapted to move slidably therein and being of a length greater than the housing means so as to allow an end of the trigger means to extend beyond the housing means in the direction toward the kite when fully inserted, the trigger means also comprising an aperture passing through the trigger means and passing through the aperture of the housing means, which aperture is parallel to the longitudinal axis and is adapted to receive the kite string;

means for biasing the trigger means into the aperture of the housing means and toward the kite so as to retain each wing in the ascending position; and

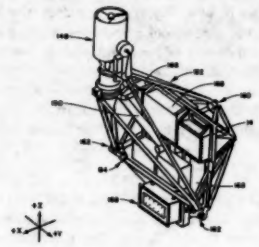
stop means located on the kite string whereby when the extending end of the trigger means contacts the stop means and the housing means is pushed further toward the kite, the trigger means experiences relative motion back into the housing means thus releasing each wing from its ascending position and allowing each wing to assume its descending position.

4,697,767

SPACECRAFT SUBSYSTEM SUPPORT STRUCTURE

Mark A. Witten, St. Charles County; Robert B. Hotze, Kirkwood, and Leonard E. Stephenson, Ferguson, all of Mo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 28, 1986, Ser. No. 867,652
Int. Cl.[4] B64G *1/22*
U.S. Cl. 244—158 R 7 Claims



1. A structural system attached to a spacecraft at three attachment points, said structural system fixedly holding a plurality of equipment assemblies, said structural system comprising:

a truss system for fixedly holding a distal equipment assembly, said truss system having three traingular trusses, three joints being apexes, one from each of said trusses, are fixedly attached to said distal equipment assembly by truss tubes, one of said trusses having two base joints, each fixedly connected to one of lower attachment points of said spacecraft being oppositely positioned in said structural system; a second truss of said trusses having two base joints, one connected to one of said lower attachment points being oppositely positioned, the other of said base joints of said second truss connected to a central attachment point of said spacecraft; a third truss of said trusses having two base joints, one connected to the other of said lower attachment points being oppositely positioned, the other base joint of said third truss being attached to said central attachment point; said trusses being graphite-epoxy tubes fixedly attach to fittings of said trusses;

an equipment support assembly for fixedly holding equipment assemblies, said equipment support assembly having an equipment support frame and a backup frame, said frames having a plurality of frame members composed of graphite-epoxy composite material, said frame members having equipment and mounting tabs and blades mounted integrally thereon, said frames having selectively positioned mounting blades, said equipment support assembly having internal stiffing tubes being connected to said blades; and

a plurality of equipment support assembly tubes for fixedly holding said support assembly to said attachment points, said support assembly tubes being composed of graphite-epoxy composite material, said tubes being fixedly connected to blades of said attachment points and of said frames whereby said structural system provides:

less than 500 microradians of total angular displacement of a line of sight under operational conditions;

less than 170 microradians of total angular displacement of said line of sight on-orbit; and

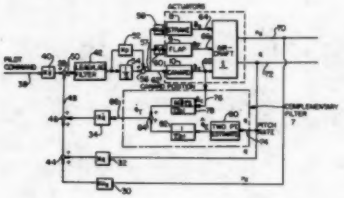
less than 50 microradians per hour angular rate of change of said line of sight during on-orbit operations.

4,697,768

FLIGHT CONTROL SYSTEM EMPLOYING COMPLEMENTARY FILTER

Robert W. Klein, Rancho Palos Verdes, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Nov. 12, 1985, Ser. No. 797,089
Int. Cl.[4] B64C *13/16*
U.S. Cl. 244—191 8 Claims



1. In a flight control system for reducing a multi-control surface aircraft wherein an error signal is formed from signal components including a pilot stick signal and a composite feedback signal, the system comprising:

means for sensing vertical acceleration of an aircraft and generating a signal corresponding thereto;

means for sensing pitch rate of an aircraft and generating a signal corresponding thereto;

a complementary filter having

(a) means for high-pass filtering a signal generated from a position sensor connected to one of the control surfaces;

(b) means for low-pass filtering the signal generated from the position sensor connected to the control surface;

(c) means for summing the low and high pass filtered signals;

means for combining the stick signal, vertical acceleration, pitch rate, and summed filtered signals to form the error signal; and

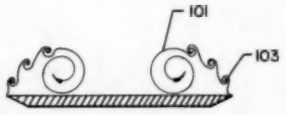
means for connecting the error signal to actuators for each of the multi-control surfaces.

4,697,769

METHOD AND APPARATUS FOR CONTROLLING BOUND VORTICES IN THE VICINITY OF LIFTING SURFACES

Ron F. Blackwelder, Palos Verdes, Calif.; Mohamed Gad-el-Hak, Federal Way, and Randy A. Srnsky, Kent, both of Wash., assignors to Flow Industries, Inc., Kent, Wash.

Filed Apr. 23, 1984, Ser. No. 603,097
Int. Cl.[4] B64C *23/06*
U.S. Cl. 244—199 8 Claims



5. A method for altering the lift of a lifting surface comprising the steps of:

producing a periodic flow to perturb the shedding of discrete vortices wherein a greater flow period than the shedding period increases lift and a lesser flow period than the shedding period decreases lift; and,

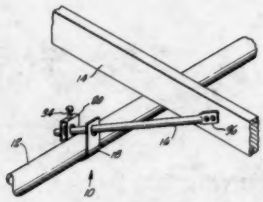
continuing the production until the desired lift is obtained.

4,697,770

SWAY BRACE FOR PIPING

Kraig A. Kirschner, Chino, Calif., assignor to Automatic Fire Control, Inc., South El Monte, Calif.

Filed May 29, 1986, Ser. No. 867,917
Int. Cl.[4] E21F *17/02*
U.S. Cl. 248—62 **4 Claims**



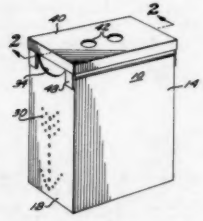
1. A sway brace for use in securing a fluid supply pipe to an elongated bracing element secured to a building structure for limiting relative movement between the pipe and the structure, said sway brace comprising a substantially flat U-shaped band member adapted to be disposed about a portion of the pipe, one end of the band member being bent backwardly to provide said end with an inverted U-shaped configuration comprising a pair of spaced substantially parallel leg portions and a spanning bar portion, the other end of said band member and said leg portions having axially aligned apertures extending therethrough for receiving the elongated bracing element, and securement means carried by said bar portion and extending therefrom between said parallel leg portions such that upon disposing said band member about the pipe and inserting the elongated bracing element through said axially aligned apertures and urging said securement means against said elongated bracing element, said securement means urges the elongated bracing element against said leg portions of said band member thereby securing said one end of said band member to the elongated bracing element and concurrently securing the pipe to the elongated bracing element and the structure.

4,697,771

REFUSE RECEPTACLE FOR RECEIVING DISPOSABLE REFUSE BAGS

Anthony P. Majors, 12807 Cijon St., San Diego, Calif. 92129

Filed Sep. 22, 1986, Ser. No. 910,376
Int. Cl.[4] A63B *55/04*
U.S. Cl. 248—97 **10 Claims**



1. A refuse receptacle for receiving a paper bag having a bottom panel and free standing front, back and side panels which define an upwardly open refuse receiving refuse space of generally rectangular horizontal cross section, each of the upper edges of the side panels being characterized by vertical fold lines which tend to bias such upper edges inwardly to partially close the open end of the bag, said refuse receptacle comprising:

bottom support means for supporting the bottom panel of the bag;

front and back support means for supporting the front and back panels of the bag; and

a pair of side support means for supporting the side panels of the bag, said bottom, front, back and side support means defining an upwardly opening refuse bag receiving space, said side support means including retainer openings, respectively, having upper margins characterized by depending, immovable retainer means extending downwardly into said retainer openings, said retainer means being dimensioned so as to engage the upper edges of the bag side panels whereby upon pressing the side panels outwardly, the side panel upper edges are bent over by said retainer means until such edges are located outwardly of said retainer means, said retainer means being adapted to engage such edges in such location after such edges bend back to their original unbent state, thereby retaining such edges outwardly of said retainer means.

4,697,772

UNIVERSAL HEAD FOR A TRIPOD

Yoshinobu Kosugi, Tokyo, and Kaoru Tachibana, Sakado, both of Japan, assignors to Slik Tripod Co., Ltd., Saitama, Japan

Filed Oct. 23, 1986, Ser. No. 923,435
Claims priority, application Japan, Nov. 1, 1985, 60-169087; Nov. 13, 1985, 60-174664
Int. Cl.[4] F16M *11/12*
U.S. Cl. 248—183 **4 Claims**

1. A universal head for a tripod comprising:

a vertical first shaft at an upper portion of the tripod;

a pan member rotatably mounted on the first shaft, and having a horizontal second shaft extending at a right angle to the first shaft;

a tilt member rotatably mounted on the second shaft, the tilt member including: (a) a pair of support lugs which are horizontally spaced from each other and are, respectively, provided with a pair of opposing faces, and (b) a third shaft extending horizontally at a right angle to the second shaft and secured to said pair of support lugs;

a projection provided on one of the pair of opposing faces of the support lugs;

a camera platform including a surface on which a camera is mounted and a bottom surface, and a bracket located between the support lugs and rotatably mounted on the third shaft, said bracket having a pair of end faces the distance between which is shorter than the distance between the pair of opposing faces of the support lugs so that said bracket is movable in the axial direction of the third shaft between the pair of opposing faces of the support lugs and is rotatable with reference to the support lugs about the third shaft as a center of rotation, one of said pair of end faces of the bracket being provided with a first recess and a second recess, said first recess receives the

projection when the camera platform is lowered to a horizontal position, and when said bracket is at said one of the pair of opposing faces of the support lugs, and said second recess is positioned at an angle of 90 degrees to the first recess and receives the projection when the camera platform is raised to a vertical position and when said bracket is at said one of the pair of opposing faces of the support lugs;

resilient means, held between the other end face of the bracket and the opposing face of the other support lug for urging the bracket toward said one of the opposing faces of the support lugs; and

a stopper means for horizontally supporting the camera platform by engaging the camera platform when the camera platform is lowered to the horizontal position.

4,697,773

VERTICALLY ADJUSTABLE POST FOR A FILM OR TELEVISION CAMERA TRIPOD

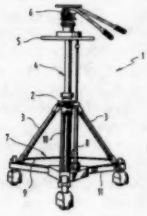
Leonhard Jaumann, Munich, and Helmut Kus, Ottobrunn, both of Fed. Rep. of Germany, assignors to Sachtler GmbH Filmtechnische Gerate, Garching, Fed. Rep. of Germany

Filed Feb. 5, 1986, Ser. No. 826,569

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1985, 3504362

Int. Cl.[4] F16M *11/00*

U.S. Cl. 248—162.1 **19 Claims**



1. A vertically adjustable post, capable of forming the central post of a tripod for mounting a camera, having as vertically adjustable element an pneumatic cylinder including a cylindrical cup-shaped housing, a central piston rod connected to the bottom of said housing and carrying on its free end a guide piston, slidingly passed between said housing and said guide piston and a piston rod is a cup-shaped internal cylinder which rests on said guide piston and on said piston rod via sealing means and is connected at its closed end with a vertically adjustable supporting device for the camera, said guide piston having an orifice between the spaces of said internal cylinder that it divides, and said internal cylinder being adapted to be filled with a pressurized gas, wherein the diameter of said piston rod, has an increasing taper from the guide piston to the bottom of said housing (**10**) such that said pneumatic cylinder (**4**) provides a substantially constant upwardly acting support force throughout the stroke of the piston in the cylinder and said sealing means (**15**), between said internal cylinder (**14**) and said piston rod (**12**), being radially resilient and having a serpentine cross-section to permit expansion and contraction of said sealing means for constantly maintaining a sealing engagement with the variation in diameter of said piston rod (**12**).

4,697,774

FASTENING DEVICE FOR ATTACHING AN OBJECT TO A SUPPORT

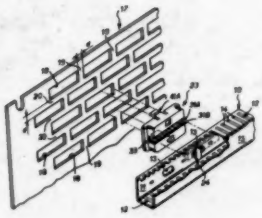
Francois Sarton, Totes, and Gérard Roby, Bihorel, both of France, assignors to Legrand, Limoges, France

Filed Nov. 20, 1984, Ser. No. 673,367

Claims priority, application France, Dec. 9, 1983, 83 19782

Int. Cl.[4] G09F *3/18*

U.S. Cl. 248—221.4 **3 Claims**



1. A fastening device comprising two separate parts, one of said separate parts comprising a base member having means for attaching said base member to a support and the other of said separate parts comprising a head member adapted to be connected to an apertured member, said base member and said head member having complementary snap fastening means for attaching said base member and said head member together, said head member having a fastening boss projecting away from its snap fastening means, said fastening boss being adapted to be inserted into and turned in an opening in an apertured member for attaching the latter, said snap fastening means on said base member being elongated in an elongate direction, said fastening boss extending transversely relative to said elongate direction of said snap fastening means when said head member is attached to said base member, and said snap fastening means mounting said head member for movement in said elongate direction for adjusting the position of said head member relative to said base member, said snap fastening means on said base member comprising two snap fastener teeth, at least one of said snap fastener teeth being elastically deformable, said snap fastening means on said head member comprising a snap fastening boss cooperable with said snap fastener teeth, said base member having an interior and including a front bearing plate against which an apertured member is adapted to bear, said snap fastener teeth being set back relative to said front bearing plate, said snap fastener teeth being in one piece with said front bearing plate, each snap fastener tooth constituting an extension of said front bearing plate towards said base member interior, and said base member comprising a transverse internal stiffener, a transverse groove interrupting said snap fastener teeth midway along said snap fastener teeth in a length direction and being aligned with said transverse internal stiffener.

4,697,775

BOAT GUNWALE ATTACHMENT APPARATUS

Mark E. Wille, 133 Seager Dr., Oconomowoc, Wis. 53066

Filed Aug. 29, 1986, Ser. No. 901,957

Int. Cl.[4] A47B *96/06*

U.S. Cl. 248—231.4 **7 Claims**

1. Boat gunwale attachment apparatus wherein the improvement comprises:

a—an outboard housing segment,

b—an inboard housing segment and

c—an assembly screw rigidly attached to said outboard housing segment, and

d—said assembly screw rigidly attached horizontally from said outboard housing segment, and

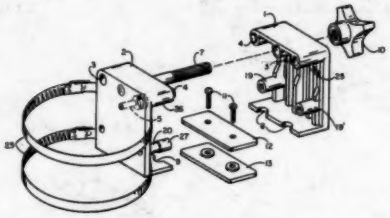
e—said assembly screw extending horizontally inward

f—through assembly screw through hole, of said inboard housing segment, and

g—bases of inboard and outboard housing segments fitting in slots between

h—upper attachment on gunwale and lower attachment on gunwale, and

i—said upper attachment on gunwale and said lower attachment on gunwale separated by spacers to provide said slots and



j—notches in said bases of inboard and outboard housing segments and, and

k—wing nut screwed on said assembly screw extending horizontally through assembly screw hole in inboard housing segment to bring the outboard and inboard housing segments into contact of their mating segments.

4,697,776

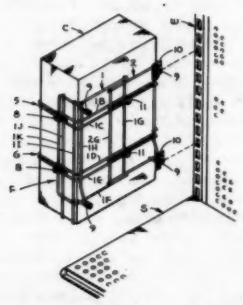
SUPPORT FRAME FOR A DISPLAY CARTON

Sydney Edson, East Meadow, N.Y., assignor to Sara Lee Corporation, Winston-Salem, N.C.

Filed Apr. 10, 1986, Ser. No. 850,029

Int. Cl.[4] A47F *5/08*

U.S. Cl. 248—311.2 **6 Claims**



1. A support frame for holding a generally rectangular display carton having an open front, encompassed by side, top, bottom, and rear walls comprising: a generally U-shaped skeleton-like structure defined by a vertically extending rear section engageable with the rear wall of the carton; said U-shaped structure further defined by vertically extending opposed end sections integral with and extending in a direction transverse to said rear section engageable with the side walls of the carton; horizontally extending carton support means integral with said end sections and extending transversely thereof and facing each other for engagement with the bottom of the carton; confining means on said end sections extending in a generally coplanar manner therewith having means engageable with front edges of the side walls of the carton to confine the carton in said support frame, said rear section being divided into plural slidably interconnected laterally adjustable members for receiving cartons of varying sizes and including means to lock the last mentioned members in selected adjusted position.

4,697,777

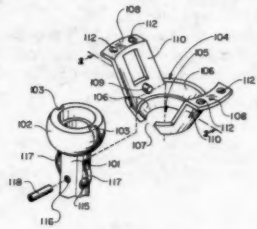
SWIVEL CANOPY

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Aug. 4, 1986, Ser. No. 892,295

Int. Cl.[4] F16M *1/00*

U.S. Cl. 248—343 **2 Claims**



1. In a swivel canopy for hanging electrical fixtures of the type having

at least two upper mounting flanges;

means for securing said mounting flanges to a ceiling;

at least two downwardly converging legs, each leg having an upper portion being integral with one of the flanges and each leg further having a lower portion;

a spherical retaining surface being integral with the lower portion of said legs, said surface having a vertical bore formed therethrough defining the zone of a sphere;

a swivel member having at least one keyway formed thereon, said swivel member being supported at the inner periphery of the spherical retaining surface;

at least one key formed on the retaining surface for cooperating with the keyway, said key being substantially circular in shape and being positioned on the retaining surface contacting the center of gravity of the swivel ball, wherein the swivel ball is substantially hemispherically supported by the key and the retaining surface, whereby additional structure support is provided; and

a hollow suspension conduit having an upper portion being suitably secured to the swivel member and a lower portion for supporting an electrical fixture thereon for suspension below the retaining surface;

the improvement thereupon comprising:

said suspension conduit further having a first and a second aperture formed therein, said apertures being positioned diametrically on the conduit in substantial horizontal alignment with one another;

a substantially U-shaped resiliently, outwardly biased spring member having a first end and a second end, said spring member being disposed through each of said apertures so that said first end and said second end emerge from a respective aperture and extend upwardly therefrom towards the ceiling;

said suspension conduit further having a third aperture being formed therein, said third aperture being equidistantly positioned between the first and second apertures on a substantially common horizontal plane therewith; and

a roll pin horizontally disposed through the third aperture and being received within the conduit in a position above the spring member, thereby preventing upward movement of the spring member;

wherein, during installation of the suspension conduit in the bearing retainer the spring member resiliently engages the retaining surface creating force, whereby proper installation of the bearing retainer to the ceiling may be tested to insure its proper installation so that adequate support and stability is provided.

4,697,778

TELEVISION TURNTABLE FOR PROVIDING IMPROVED STABILITY

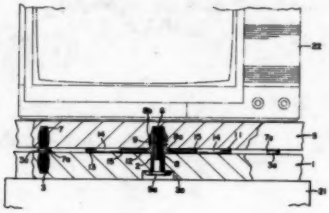
Eiichi Harashima, Hachioji, Japan, assignor to Kabushiki Kaisha Murakoshi Seiko, Tokyo, Japan

Filed Jul. 16, 1986, Ser. No. 886,057

Claims priority, application Japan, Jul. 25, 1985, 60-114115[U]

Int. Cl.[4] A47B *91/00*

U.S. Cl. 248—349 **5 Claims**



1. A turntable comprising:

a base member,

a rotatable member supported above said base member by a shaft positioned at the center of said base member and said rotatable member so that said rotatable member is rotatable freely via said shaft with respect to said base member, and

a bearing means arranged between said base member and said rotatable member, said bearing means including:

a plate member positioned between said base member and said rotatable member, said shaft being inserted rotatably through said plate member at the center thereof,

a plurality of elongated roller retaining bores formed in said plate member so that said bores extend radially around said shaft, and

elongated cylindrical rollers rotatably held in said roller retaining bores and sandwiched between said base member and said rotatable member, and

each of said roller retaining bores being provided with inwardly extending projections at the upper and lower edge portions of two opposing side sections of said bores for retaining each respective roller within the respective bore.

4,697,779

ARTICULATION DEVICE FOR USE IN RAISING AND SUPPORTING AN ANTENNA MAST

Guy Guislain, 103 Grand'rue, 59158 Maulde, France

Filed Jun. 18, 1985, Ser. No. 745,933

Claims priority, application France, Jun. 18, 1984, 84 10001

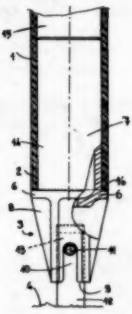
Int. Cl.[4] F16B *7/00*; H01Q *1/12*

U.S. Cl. 248—530 **4 Claims**

1. A device adapted to be used in raising and supporting an antenna mast comprising:

a ground stake adapted to be fixed in the ground, said ground stake having a journal projecting a predetermined distance horizontally from both sides thereof;

a mast-engaging member, said mast-engaging member comprising a collar, a means for affixing said member to said mast, said affixing means extending from a first side of said collar, and two plates having faces parallel to each other, said plates depending from a second side of said collar, each plate having a slot opening which opens out a free end of the plate, said openings forming a pair of spaced forks, said slots being adapted to engage said journal to permit the mast-engaging member to be selectively pivoted about said journal; and means for supporting said mast in a vertical position, whereby, when said member is affixed to said mast and brought into engagement with said journal, said mast will pivot about said journal when said mast is raised from a horizontal to a vertical orientation and when said mast is lowered from said vertical orientation to said horizontal orientation.



4,697,780

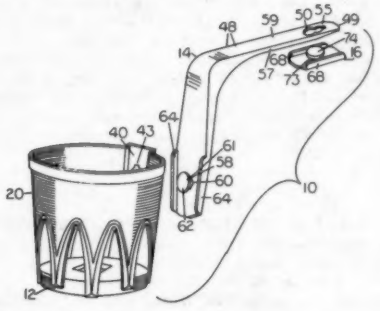
BEVERAGE CONTAINER HOLDER

Gregory J. Wenkman, Middleton, and Ferdinand F. Salzmann, Prairie du Sac, both of Wis., assignors to Uniek Plastics, Inc., Dane, Wis.

Filed Oct. 20, 1986, Ser. No. 920,741

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—558 **16 Claims**



1. A beverage container holder kit suitable for mounting on either a horizontal or vertical support surface comprising:

(a) a mounting element including (i) an adhesive backing strip on its back face, and (ii) a male mounting projection on the front face of the element;

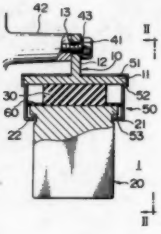
(b) a support bracket having two arms, a first arm having a mounting projection similar to the mounting projection on the mounting element and a second arm having formed thereon a female mounting site; and

(c) a receptacle element including (i) a substantially horizontal base on which a beverage container may rest, (ii) a retaining wall extending generally upwardly from the base to restrain a beverage container placed on the base from horizontal movement, (iii) a bottom mounting surface connected to and spaced below the horizontal base, the bottom mounting surface including therein a female mounting site and (iv) a side mounting surface spaced from and attached to the retaining wall and having a female mounting site formed in it, so that the receptacle element can be vertically mounted either on a horizontal surface, hanging adjacent the edge of a horizontal surface, or suspended from a vertical surface.

4,697,781
DYNAMIC DAMPER

Hideo Hamano; Keiji Takeshita, and Yasumichi Funato, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Oct. 8, 1986, Ser. No. 916,745
Claims priority, application Japan, Oct. 18, 1985, 60-159711[U]
Int. Cl.[4] F16F 7/10
U.S. Cl. 248—559 6 Claims

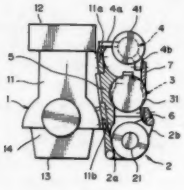


1. A dynamic damper comprising:
a weight having a predetermined resonance frequency;
a support member a part of which is to be connected to an oscillating member;
a resilient member made of a resilient material, said resilient member disposed between said weight and said support member and fixed thereto;
a hollow cover member for encircling said support member, said resilient member and at least a part of said weight, and for providing at one end portion thereof a seal between said support member and said cover member; and
a membrane made of the same material as said resilient member, said membrane fixed at a part thereof on said weight and having an outer periphery being in fluid-tightly contact with an inner wall surface of said cover member while permitting a slidable movement of said membrane along said cover member.

4,697,782
STRUCTURE FOR MOUNTING ENGINE AUXILIARIES

Megumu Ban, Okazaki, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 30, 1986, Ser. No. 891,925
Claims priority, application Japan, Aug. 27, 1985, 60-129489[U]
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—639 4 Claims

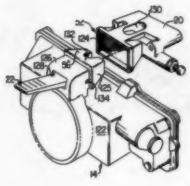


1. A structure for mounting a plurality of engine auxiliaries on an engine body, said auxiliaries being driven via respective belts by a crank pulley of the engine of a vehicle, said structure comprising:
a single structured bracket rigidly attached to the engine body, said plurality of engine auxiliaries being fixed on said single structure bracket at first sides thereof in multistages; and,
a plurality of brackets for rigidly connecting adjacent engine auxiliaries to each other at second sides thereof, said second sides of the engine auxiliaries being opposite said first sides and said single structured bracket.

4,697,783
QUICK RELEASE NIGHT VISION GOGGLE MOUNTING BRACKET

William A. Kastendieck, Wylie; Richard T. Hart, Garland, and Wayne Isbell, Dallas, all of Tex., assignors to Varo, Inc., Garland, Tex.

Filed Dec. 12, 1985, Ser. No. 808,092
Int. Cl.[4] A42B 7/00
U.S. Cl. 248—900 7 Claims

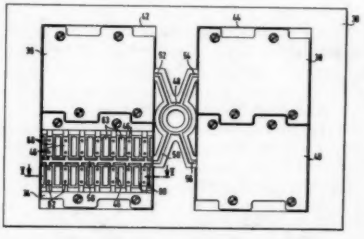


1. A support for releasably supporting vision equipment to a headgear, comprising:
a tapered stud with a channel therethrough;
an elbow member connecting said stud to the vision equipment, and having a channel coaxial with the channel of said stud;
a tapered receptacle fixed to the headgear for receiving said stud;
a release lever disposed through the channel of said stud and the channel of said elbow an pivotally mounted within one of said channels, said release lever having a transverse notch near one end thereof;
a lug adjustably fixed within said receptacle and latchable with said transverse notch; and
bias means for biasing the notch of said lever into said latching engaement with said lug.

4,697,784
INJECTION MOLD FOR PRODUCING THE HOUSINGS OF INTEGRATED CIRCUITS

Hermann Schmid, Schwaig, Fed. Rep. of Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 4, 1986, Ser. No. 835,901
Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517607
Int. Cl.[4] B22C 9/20
U.S. Cl. 249—119 5 Claims



1. An injection mold for producing the housings of integrated circuits comprising:
(1) a first mold half having disposed therein a plurality of mold recesses corresponding in number to the housings to be formed therein, and having a depth corresponding to a

portion of the thickness of the housings, said first half also having disposed therein a plurality of supply passages leading to the recesses;

(2) a second mold half having a plurality of mold portions with recesses therein arranged to coincide with the recesses of the first half, when the halves are brought into the closed position;

(3) first means within said second half for supporting each of said mold portions displaceably in the closure and opening direction;

(4) second means within said second half for individually force-locking each of said mold portions into engagement with said first mold half when the halves are brought into the closed position; and

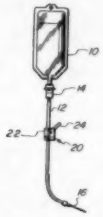
(5) means in combination therewith for opening and closing said mold halves.

4,697,785

CLAMP FOR REGULATING FLOW OF PARENTERAL SOLUTIONS

Robert D. Tuseth, 10642 El Toro Ave., Fountain Valley, Calif. 92708

Filed Apr. 14, 1986, Ser. No. 851,462
Int. Cl.[4] F16L *55/14*; F16K *7/06*
U.S. Cl. 251—9 **14 Claims**



1. In a clamp for regulating the flow of fluid through a length of flexible tubing the combination which comprises:

(a) a clamp body defining a surface for supporting the flexible tubing, opposing walls extending from the support surface for providing a passageway for the tubing, and a top surface extending above and overlying a portion of the support surface which extends between the walls for permanently compressing the portion of the tubing positioned between the top and support surfaces into a closed position while allowing the uncompressed portion of the tubing to form an open channel for the flow of fluid therethrough; and

(b) platen means moveably mounted on the clamp body and arranged to exert an incremental compressive force on the portion of the tubing forming the open channel to thereby control the size of channel and regulate the flow of fluid therethrough, said permanently compressed tubing portion being independent of the movement of said platen means.

4,697,786

ECCENTRIC PLUG VALVE

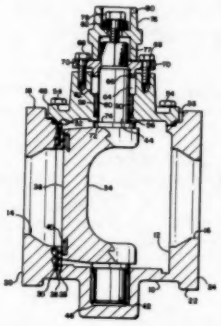
Paul G. Kennedy, Horseheads, N.Y., assignor to ITT Corporation, New York, N.Y.

Continuation of Ser. No. 622,917, Jun. 21, 1984, abandoned. This application Jul. 10, 1986, Ser. No. 883,448
Int. Cl.[4] F16K *5/04*
U.S. Cl. 251—309 **2 Claims**

1. An eccentric plug valve comprising in combination:

a valve body having a cylindrical valve chamber centered on an axis, an inlet into said valve chamber having an axis at an angle to said valve chamber axis, an outlet from said valve chamber, said inlet and said outlet are aligned along a common axis which is transverse to said axis of said valve chamber, and a resilient ring set into the wall of said valve chamber and forming an annular seating surface surrounding said inlet, said resilient ring taking the form of a rigid flat metallic insert having a solid cross-section encased in rubber, said rigid metallic insert providing support and acting as a reaction surface upon closure of said valve;

a rotary valve plug disposed within said valve chamber and having a cylindrical sealing face, said valve plug containing a plug body of a metallic material and a metal ring embedded in and fused with said metallic material of said plug body at said cylindrical sealing surface, and said cylindrical sealing face having a rotation axis parallel to and offset from the axis of said valve chamber and about which said valve plug pivots to move said sealing face across said annular seating surface to bring said metal ring into registration with the rubber of said resilient ring;



said valve plug is "C" shaped in vertical cross-section with the vertical portion of the "C" forming said sealing face and extending parallel to said axis of said sealing face;

said valve body includes an opening at the top of said valve chamber and a valve cap closing off said opening, and has a channel at the bottom of said valve chamber within which the bottom edge of said resilient ring is fitted and said valve cap has a channel within which the top edge of said resilient ring is fitted;

said resilient ring has a vertical slot in said top edge and said valve cap has a pin in said valve cap channel to fit within said vertical slot to oppose movement of said resilient ring along the wall of said valve chamber as said valve plug is moved between the open and closed positions; and

said metal ring is a nickel alloy ring which is flush with said cylindrical sealing face.

4,697,787

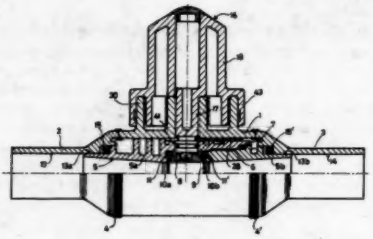
BALL VALVE MADE ENTIRELY OF PLASTICS MATERIAL

Nicolaas Pelleboer, Olst, Netherlands, assignor to Nederlandse Industriele Maatschappij Nefit B.V., Deventer, Netherlands

Filed Dec. 17, 1985, Ser. No. 809,902
Claims priority, application Netherlands, Dec. 17, 1984, 8403825
Int. Cl.[4] F16K *5/06*
U.S. Cl. 251—315 **11 Claims**

1. Ball valve made entirely of plastics material, comprising a tubular casing and a pair of connection pieces which are fastened to both its ends and which together form a through passage for a medium, a ball disposed in the through passage inside the casing and provided with a through opening, an operating means comprising a spindle inserted into an opening in the casing, cooperating with the ball, and having an operating grip to enable the ball to be turned so as to close or open the through passage, said casing comprising a substantially

cylindrical outer casing to each end of which the connection pieces are welded, and an inner casing which is disposed within said outer casing and is constructed of two parts connected together each part having a seat and which enclose the ball between them, the inner casing being provided at each end



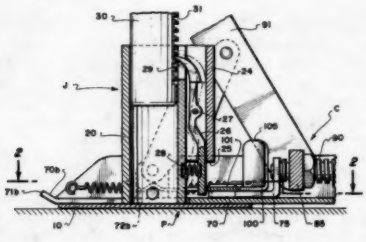
with an external cylindrical surface projecting axially out of the outer casing, and such external cylindrical surface slidably cooperating with an internal cylindrical surface on the two connection pieces to define a guide for axial displacement of said connection pieces relative to said inner casing.

4,697,788

MEANS FOR AUTOMATICALLY RELEASING A JACK SYSTEM

Harry H. Arzouman, Los Angeles, Calif., assignor to Safe-T-Jack, Inc., Irvine, Calif.

Filed May 5, 1986, Ser. No. 859,462
Int. Cl.[4] B66F *5/04*
U.S. Cl. 254—8 B **6 Claims**



1. In a two-part jacking system including an extendible jack stand having a flat base plate, a hollow frame secured to said base plate, a vertical shaft having ratchet teeth formed thereon adapted for telescoping movement within said frame, a vertically disposed pawl assembly pivotally supported within said frame and selectively engageable with said ratchet teeth of said vertical shaft to lock said shaft in a selected elevational position relative to said base plate or to release said shaft from such position, the lowermost end of said pawl assembly extending downward and being exposed so that a force may be applied thereto for releasing said pawl assembly from said ratchet teeth, and a power unit adapted to be aligned with and releasably attached to said jack stand for selectively raising and lowering said jack stand;

means for automatically releasing said pawl assembly from said ratchet teeth for lowering said vertical shaft when loading forces are removed from said vertical shaft, comprising:

a pusher member supported from said power unit and aligned to selectively engage said lowermost end of said pawl assembly:

means operatively connected to said pusher member for biasing said pusher member against said lowermost end of said pawl assembly and adapted to drive said lowermost end of said pawl assembly to release said pawl assembly from said ratchet teeth when said loading forces are removed from said vertical shaft; and,

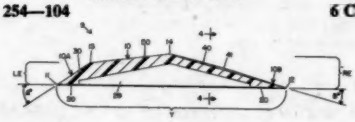
means operatively connected to said pusher member for selectively restraining and releasing said pusher member from engaging said lowermost end of said pawl assembly.

4,697,789

LOCKSMITH'S WEDGE FOR AUTOMOBILE DOORS

Donald L. Parkins, 846 South 35th Avenue, Omaha, Nebr. 68105

Filed Aug. 28, 1986, Ser. No. 901,403
Int. Cl.[4] G66F *15/00*
U.S. Cl. 254—104 **6 Claims**



1. Locksmith's wedge tool for prying a working opening between the transparent pane and the casing of an automobile door, said tool wholly consisting of a monolithic and predominately non-metallic block extending longitudinally along a generally horizontal planar base surface that is longitudinally bounded by two transverse ends including a left-end and a right-end, said monolithic block comprising:

(A) a wholly planar upper-left first surface having a finite first-area and intersecting said left-end at an angular value selectable from the range of substantially 30° to 40°, whereby said monolithic block includes an angular left-wedge, having a linearly extending apex at said block left-end;

(B) an upper-right second surface having a finite second-area and intersecting said right-end at an angular value selectable from the range of substantially 10° to 20°, whereby said monolithic block includes an angular right-wedge having a linearly extending apex at said block right-end, and central transversely extending portions of said second surface being slightly convex;

(C) an upper-medial third surface intersecting said first surface along a transversely extending left-edge linear fulcrum that loftily overlies said base surface, said third surface extending upwardly from said left-edge and intersecting said second surface along a transversely extending right-edge linear fulcrum that overlies said base surface; and

(D) an upright leadward surface and an upright trailward surface, said leadward and trailward surfaces respectively and independently linearly intersecting said first, said second, and said third surfaces.

4,697,790

PULLEY HOISTS

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Nov. 21, 1985, Ser. No. 800,285
Int. Cl.[4] B66D *3/00*; G01L *5/06*
U.S. Cl. 254—332 **1 Claim**

1. A anchor hook for a pulley hoist having a power unit, in combination, comprising:

a bifurcated connector element including a top wall having a pair of upwardly-extending side walls, said top wall further having an aperture formed therein;

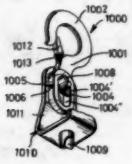
a connector shaft having a longitudinal axis, a one end being secured to the power unit and a second end including an enlarged portion formed thereon;

a hook including a closed end and an open hooking portion, said closed end having a pair of transverse slots formed therethrough said slots being substantially aligned with each other, each on an axis being transverse to the hook, and defining a shear strip portion therebetween said

closed end being received between the side walls of the connector element;

a bolt shaft carried by each upwardly-extending sidewall and extending through the slot for suitably, pivotably securing the closed end of the hook between the side walls;

a latch positioned on the open hooking portion of the anchor hook, said latch having a first open position wherein the latch is oriented in a direction away from the hooking portion, whereby the hook may be loaded and unloaded and a second closed position, wherein the latch is oriented in a direction towards and communicates with the hook-



ing portion such that said latch is positioned over the open hooking portion, whereby the anchor hook is prevented from being accidently dislodged; and

means for pivotably securing the latch for pivotal movement between the first open position and the second closed position,

said connector shaft being received through the aperture of the top wall of the connector element with the enlarged portion of the shaft abutting the top wall, providing support between the anchor hook and the power unit and permitting 360° rotation of the shaft in the aperture so that the hook may be oriented at any radial angle relative to the longitudinal axis of the connector shaft.

4,697,791

EXOTHERMIC CUTTING ELECTRODE

Harold R. Henderson, and David Mosinski, both of Lancaster, Ohio, assignors to Arcair Company, Lancaster, Ohio

Filed Dec. 31, 1985, Ser. No. 815,433
Int. Cl.[4] B23K *9/18*
U.S. Cl. 266—48 **4 Claims**

1. An exothermic cutting electrode for use on land or underwater comprising:

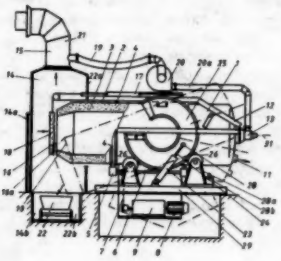
a single elongated strip of metal roll formed into a generally elongated tubular configuration, said electrode having a central, generally straight portion around which at least two turns of the strip of metal are wrapped, the electrode held together by longitudinal lock seam formed as part of the roll forming process said electrode formed with continuous inner longitudinal passages without using a non-compressible filler.

4,697,792

MELTING FURNACE

Karl Fink, Bauhofstrasse 8, A-8435 Wagna bei Leibnitz, Austria

Filed Aug. 27, 1986, Ser. No. 901,302
Claims priority, application Austria, Aug. 28, 1985, 2511/85
Int. Cl.[4] C21B *13/08*; C22B *7/00*
U.S. Cl. 266—248 **15 Claims**



1. A melting furnace having an elongated drum for receiving material to be melted and being lined with a refractory material, said furnace comprising means for rotating said drum around an axis of rotation extending in a longitudinal direction of the drum, means for performing a swivelling movement of said drum about a swivelling axis extending substantially horizontally and transverse to said axis of rotation whereby said drum can be inclined to either side of said swivelling axis from a substantially horizontal position of said drum on said swivelling axis, said furnace further comprising a burner provided at a rear end of said drum for heating the interior thereof, a discharge opening for the melt also being provided in said rear end of said drum having said burner, an opening for charging said drum and for discharging combustion gases therefrom being provided at a front end of said drum, said opening being provided with a pressure head lid, and means for moving said pressure head lid between a position giving free access to said opening and a closed position in which between an edge of said opening and said pressure head lid there is formed an annular gap for the escape of said combustion gases.

4,697,793

HYDRAULICALLY DAMPED ELASTIC ENGINE MOUNT

Horst Reuter, Wachtberg-Oberbachem; Jörn-Rainer Quast, Sinzig-Bad Bodendorf; Peter Maier, Wachtberg-Fritzdorf, and Heinrich Brenner, Bad Neuenahr-Ahrweiler, all of Fed. Rep. of Germany, assignors to BOGE GmbH, Eitorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 730,770, May 3, 1985, Pat. No. 4,645,189, Ser. No. 561,173, Dec. 14, 1983, abandoned, and Ser. No. 562,232, Dec. 16, 1983, abandoned. This application Jan. 21, 1986, Ser. No. 821,173
Claims priority, application Fed. Rep. of Germany, Jan. 19, 1985, 3501628
Int. Cl.[4] B60G *15/04*; F16M *5/00, 13/00*
U.S. Cl. 267—195 **16 Claims**

1. A resilient mounting device having hydraulic damping for vibrationally damping a motor vehicle engine, said mounting device having a longitudinal axis along which damping is prevalent, said mounting device having opposite first and second rigid end portions with mounting means thereat, said end portions being at either end of said longitudinal axis;

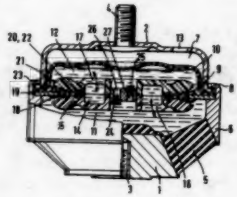
an elastic connecting element resiliently connecting said first and second end portions and forming with them a cavity for two chambers in controllable fluid communication, each with the other, said two chambers for containing damping fluid, and being disposed one adjacent the other along said longitudinal axis;

a first of said two chambers being a compression chamber

defined in part by said first rigid end portion which is sealed for permitting a build-up of pressures substantially above and below ambient pressure about said mounting device;

a second of said two chambers being an unpressurized equalization chamber defined in part by a bellows means wherein said bellows means further defines in combination with the second rigid end portion, a third chamber, said second rigid end portion defining therein airflow evacuation openings for substantially equalizing pressure in said second of said two chambers with said ambient pressure about said mounting device;

said two chambers being separated by circular partition means, said partition means having a circular outer flexible peripheral portion and a circular rigid inner portion, said rigid inner portion being disposed within said outer peripheral portion of said partition means, said outer peripheral portion comprising a flexible suspension element for holding said rigid inner portion elastically suspended between and movable within said two chambers and damping a first type of pressure differences between said two chambers;



said rigid inner portion having a central axis, which is generally perpendicular to said longitudinal axis defined therethrough, and having a continuous channel connecting said first and said second chambers, said channel following a circular route having a predetermined length, being radially displaced from and about said central axis in said rigid inner portion;

said partition means having valve means which are normally biased in a closed position to keep said valve means closed when a pressure difference between said first chamber and said secod chamber is below a first predetermined pressure differential and to keep said valve means in a closed position when a pressure difference between said second chamber and said first chamber is below a first predetermined pressure differential, said valve means being disposed in said partition means and moving therewith for opening and relieving a pressure between said chambers in a range of pressures greater than said predetermined pressure differentials, thereby minimizing cavitation and pressure peaks substantially above said ambient pressure in said damping fluid in said first chamber.

4,697,794

RUBBER MOUNTING WITH HYDRAULIC DAMPING

Heinz Breuner, Bad Neuenahr-Ahrweiler; Heinrich Meyer, Konigswinter, and Kurt Schmidt, Bad Neuenahr-Ahrweiler, all of Fed. Rep. of Germany, assignors to BOGE GmbH, Eitorf, Fed. Rep. of Germany

Continuation of Ser. No. 562,232, Dec. 16, 1983, abandoned.

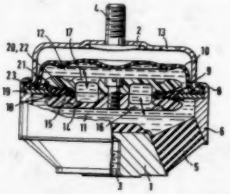
This application Apr. 11, 1986, Ser. No. 851,879

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 3246587

Int. Cl.[4] **B60G** *15/04;* **F16F** *13/00;* **B60K** *5/12;* **F16M** *13/00*

U.S. Cl. 267—195 **20 Claims**

1. In a rubber engine mounting for motor vehicles with hydraulic damping, said engine mounting having two rigid end walls which are disposed opposite to each other in the axial direction, and two fluid chambers which are arranged axially one adjacent to the other and which contain damping fluid, and of which at least one chamber has a peripheral wall which is formed as a rubber-elastic spring element such that the two end walls are resiliently connected, wherein the chambers communicate with each other by means of a flow passage which extends in an annular configuration around the central axis of the mounting in a substantially radial plane, the flow passage being provided in a movable, rigid partitioning wall separating the chambers, with inlet and outlet openings of the flow passage being disposed on respective sides of the rigid partitioning wall, the rigid partitioning wall which has the flow passage being arranged radially inwardly of, and supported by, an elastic, axially movable diaphragm which is fixedly and sealingly clamped at its outer periphery, said flow passage being substantially entirely enclosed within, and movable with, said movable rigid partitioning wall, said rigid partitioning wall in said elastic, axially movable diaphragm, in combination with said diaphragm, providing a damping characteristic which damps and decouples high frequency vibrations and noise generated in use the running of the engine in a range of about 20 Hertz to about 200 Hertz; and said flow passage having a length and a cross section area for damping and decoupling low frequency vibrations, produced by at least engine start-up and shut down, being transmitted in use between one of said two rigid end walls and the other, said low frequency vibrations being lower than the high frequency vibrations in said range of about 20 Hertz to about 200 Hertz generated by the running of the engine, whereby transmission of said engine vibrations from the engine, both by vibrations from the running engine and vibrations produced by the road and the turning on and off of the engine, to the body of the motor vehicle is minimized.



8. In a rubber engine mounting for rotor vehicles with hydraulic damping, said engine mounting having two rigid end walls which are disposed opposite to each other in the axial direction, and two fluid chambers which are arranged axially one adjacent to the other and which contain damping fluid, and of which at least one chamber has a peripheral wall which is formed as a rubber-elastic spring element such that the two end walls are resiliently connected, wherein the chambers communicate with each other by means of a flow passage which extends in an annular configuration around the central axis of the mounting in a substantially radial plane, the flow passage being provided in a movable, rigid partitioning wall separating the chambers, with inlet and outlet openings of the flow passage being disposed on respective sides of the rigid partitioning wall, the rigid partitioning wall which has the flow passage being arranged radially inwardly of, and supported by, and elastic, axially movable diaphragm which is fixedly and sealingly clamped at its outer periphery, said rigid partitioning wall in said elastic, axially movable diaphragm having, in combination with said diaphragm, providing a damping characteristic which damps and decouples high frequency vibrations and noise generated in use by the running of the engine and said flow passage being for damping and decoupling low frequencies, produced by at least engine start-up and shut down, being transmitted in use between one of said two rigid end walls and the other, said low frequency vibrations being lower than the high frequency vibrations generated by the running of the engine, whereby transmission of said engine vibrations from the engine to the body of the motor vehicle is minimized, wherein the partitioning wall is connected to the diaphragm inwardly of the outer periphery of the partitioning

wall such that the outer periphery of the partitioning wall at least partially overlaps the diaphragm on at least one of the sides of the diaphragm, the overlapping portion of the partitioning wall forming a travel limiting surface for cooperation with the adjacent side of the diaphragm, the spacing of the travel limiting surface with respect to the diaphragm increasing in a radially outward direction.

4,697,795

HYDRAULICALLY DAMPED MOUNTING DEVICE

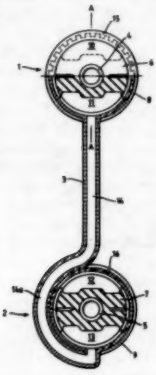
John P. West, 32 Mill Rd., Worton, Devizes, Wiltshire, England

Filed Feb. 6, 1986, Ser. No. 826,858

Claims priority, application United Kingdom, Feb. 7, 1985, 8503144

Int. Cl.[4] F16F 5/00

U.S. Cl. 267—186 10 Claims



1. A hydraulically damped mounting device comprising:

first and second bushes, each bush having a housing, an anchor point, and a resilient spring connecting said anchor point to said housing, said resilient spring of each said bush defining, together with a part of said housing of the corresponding bush, a working chamber for hydraulic fluid;

an elongate connection rigidly connecting together said first and said second bushes; and

an elongate passageway interconnecting said working chamber of each said bush for communication of hydraulic fluid therethrough;

wherein said resilient spring of each said bush, together with a further part of said housing of the corresponding bush, defines an air chamber.

4,697,796

SUSPENSION DEVICE

Makoto Kitamura, and Kiyoshi Yamaguchi, both of Kanagawa, Japan, assignors to Tokico Ltd., Kanagawa, Japan

Filed Oct. 17, 1985, Ser. No. 788,428

Claims priority, application Japan, Oct. 20, 1984, 59-158884[U]; Mar. 20, 1985, 60-41001[U]

Int. Cl.[4] F16F 9/44

U.S. Cl. 267—35 10 Claims

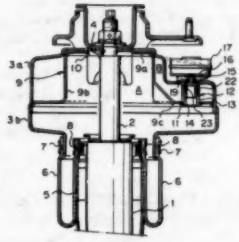
1. A suspension device comprising:

a hydraulic damper including a main body and a piston rod slidably extending through an end of said main body;

an air spring mounted between said main body and said piston rod and including first and second air chambers separated by a partition wall, such that upon movement of said piston rod relative to said main body the volume of said first air chamber varies and the volume of said second air chamber remains constant;

an opening through said partition wall, at a position spaced from said piston rod; and

means mounted on said partition wall at said position and defining a passage connected to said opening for communicating said first and second air chambers and for regulating the size of said passage, said means comprising a rotary flow control valve having therethrough at least one orifice, and means for operating said rotary flow control valve to thereby adjust the effective area of said orifice.



4,697,797

COMBINATION PNEUMATIC SPRING AND SHOCK ABSORBING APPARATUS

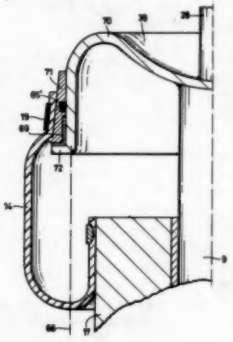
Henning Gold, Im Rheinblick 29, 6530 Bingen 1, Fed. Rep. of Germany

Filed Apr. 29, 1985, Ser. No. 728,270

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1984, 8413300[U]

Int. Cl.[4] F16F 9/02, 9/34; B60G 17/04

U.S. Cl. 267—64.24 12 Claims



1. A pneumatic spring-loaded damping apparatus, comprising:

a substantially cylindrical housing including first and second closure means for closing opposite ends of said housing;

first mounting means adjacent one of said first and second closure means for mounting said apparatus;

piston means mounted for reciprocating movement along a predetermined axis within said housing and for dividing said housing into first and second absorption chambers of complementarily increasable and decreasable volumes;

throttle means provided in said piston means for bidirectional exchange of pressure between said first and second absorption chambers;

a piston rod having one end rigidly mounted on said piston means and having a section extending through one of said first and second absorption chambers and through one of said closure means;

second mounting means affixed to said section of said piston means;

means mounted for rotation about said predetermined axis on one of said housing and said section of said piston rod;

a resilient substantially tubular bellows having a predetermined effective radius and affixed to said means mounted for rotation and the other of said housing and said section of said piston rod for forming a resilient sealed chamber; and

annular sealing means provided between said means mounted for rotation and said one of said housing and said section of said piston rod and having a radius substantially equal to said effective radius of said tubular bellows.

4,697,798

APPARATUS FOR LIFTING EQUIPMENT

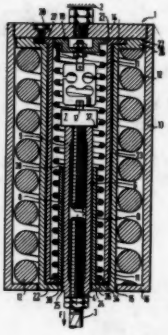
Andreas Pitter, and Werner Stenkamp, both of Schortens, Fed. Rep. of Germany, assignors to Isetron Industrie-und Sicherheits-Elektronik GmbH, Wilhelmshaven, Fed. Rep. of Germany

Filed Oct. 21, 1985, Ser. No. 789,326

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 3438985

Int. Cl.[4] **F16F** *9/00, 1/06;* **G01L** *5/00;* **F16M** *13/00*

U.S. Cl. 267—70 **6 Claims**



1. An apparatus for use with lifting equipment and capable of being interposed in a force flow path between the lifting equipment and a load to be lifted, comprising:

first and second connector means for connecting the apparatus to respective ones of the load and the lifting equipment, said first connector means being movable relative to said second connector means when the load is lifted by the lifting equipment;

first resilient spring means for absorbing an initial force produced by the lifting equipment in lifting the load, said first resilient spring means being compressible by movement of said movable first connector means, and said movable first connector means including a transducer for detecting load states and being non-positively coupled between the load and said first resilient spring means;

second resilient spring means cooperable with said first resilient spring means for absorbing additional lifting force after said first connector means has moved a predetermined distance and has compressed said first resilient spring means a predetermined amount to absorb said initial force, said first and second resilient spring means being telescopingly and coaxially arranged with said second resilient spring means at least partially surrounding said first resilient spring means;

movable compression means for causing compression of said second resilient spring means;

abutment means on said first connector means and said compression means engagable after said first connector means has moved the predetermined amount, for causing movement of said movable compression means and causing compression of said second resilient spring means together with said first resilient spring means, said first resilient spring means being of less rigid construction then said second resilient spring means and thus having a flatter spring load deflection curve than said second resilient spring means;

first support means fixedly mounted on said second connector means for precluding movement of one end of said first resilient spring means;

second support means fixedly mounted on said second connector means for precluding movement of one end of said second resilient spring means;

a first vertically movable member forming part of said compression means for said second resilient spring means and having an end portion engaged with an opposite end of said second resilient spring means;

a second vertically movable member having an end portion engaged with an opposite end portion of said first vertically movable member; and

a driver member forming a part of said first connecting means and having a portion engagable with an opposite end portion of said second vertically movable member for moving said first and second vertically movable members to compress said second resilient spring means, said engagable portions of said driver member and second vertically movable member forming said abutment means.

5. An apparatus for use with lifting equipment and capable of being interposed in a force flow path between the lifting equipment and a load to be lifted, comprising:

first and second connector means for connecting the apparatus to respective ones of the load and the lifting equipment, said first connector means being movable relative to said second connector means when the load is lifted by the lifting equipment;

first resilient spring means for absorbing an initial force prodcued by the lifting equipment in lifting the load, said first resilient spring means being compressible by movement of said movable first connector means, and said movable first connector means including a transducer for detecting load states and being non-positively coupled between the load and said first resilient spring means, said non-positively coupled transducer directly measuring forces caused by the load during the initial compression of said first resilient spring means, while higher forces causing said second resilient spring means to be compressed along with said first resilient spring means cause the forces to be subdivided between said first and second resilient spring means, respectively, whereupon said transducer measures the subdivided force in said first resilient spring means, thereby expanding the measuring capability of said transducer;

second resilient spring means cooperable with said first resilient spring means for absorbing additional lifting force after said first connector means has moved a predetermined distance and has compressed said first resilient spring means a predetermined amount to absorb said initial force, said first and second resilient spring means being telesopingly and coaxially arranged with said second resilient spring means at least partially surrounding said first resilient spring means;

movable compression means for causing compression of said second resilient spring means;

abutment means on said first connector means and said compression means engagable after said first connector means has moved the predetermined amount, for causing movement of said movable compression means and causing compression of said second resilient spring means together with said first resilient spring means, said first resilient spring means being of less rigid construction then said second resilient spring means and thus having a flatter spring load deflection curve than said second resilient spring means;

a cylindrical member fixedly mounted on said second con-

nector means and surrounding said first resilient spring means, said cylindrical member including retaining means for limiting movement of a lower end of said first resilient spring means;

an axially movable cylindrical member forming part of said compression means for said second resilient spring means, said movable cylindrical member surrounding said fixedly mounted cylindrical member and having an upper end portion engaged with an upper end portion of said second resilient spring means for compressing said second resilient spring means;

a spacer bushing disposed raadially inward of said fixedly mounted cylindrical member and said first resilient spring means and having a lower end portion engaged with a lower end portion of said movable cylindrical member, said spacer bushing being axially movable to cause axial movement of said second cylindrical member; and

a driver member forming a part of said load connecting means and rigidly connected to said transducer, with a portion of said driver member and an upper end portion of said spacer bushing being engagable and defining said abutment means.

4,697,799

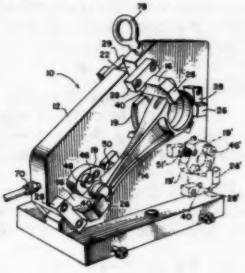
SUPPORT FOR PRECISELY HOLDING A WORKPIECE

John L. Wickham, Glenarm, and Jeffrey D. Fox, Joppatowne, both of Md., assignors to The J. L. Wickham Company, Inc., Baltimore, Md.

Filed Mar. 10, 1986, Ser. No. 838,131

Int. Cl.[4] B25B *1/20*

U.S. Cl. 269—32 **18 Claims**



1. Apparatus for sensing the precise positioning of a workpiece and holding the workpiece for a machining operation comprising:

a support;

means for sensing the proper positioning of the workpiece relative to said support at a plurality of locations on the workpiece;

means, responsive to said sensing means, for clamping the workpiece in the proper position on a first side of said support;

said clamping means including at least first and second clamp elements connected by a body portion means, said body portion means positioned on a side of said support opposite said first side and movable to first and second positions to cause said connected clamp elements to move into and out of engagement with the workpiece; and

power drive means connected to said body portion means for moving said body portion between said first and second positions in response to proper positioning of the workpiece sensed by said means for sensing.

4,697,800

CLAMPING DEVICE

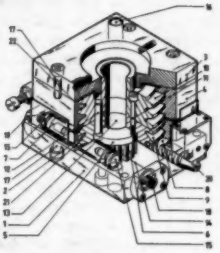
Bernard Stahl, Neunkirchen-Salchendorf, and Horst Böhm, Siegen, both of Fed. Rep. of Germany, assignors to Optima Spanntechnik GmbH

Filed Aug. 26, 1986, Ser. No. 900,536

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1985, 3537337; Feb. 21, 1986, 3605620

Int. Cl.[4] B23Q *3/08*

U.S. Cl. 269—32 **20 Claims**



1. A clamping device for clamping an object in position, said device comprising a clamping anchor, a clamping cylinder, means operatively connecting said clamping cylinder to said clamping anchor, fluid pressure means for operating said clamping cylinder, said clamping cylinder being operated exclusively by said fluid pressure means, and a compensating unit, said compensating unit comprising at least two components, mechanical means for separating said components axially one from the other, a fluid pressure device for operating said mechanical means and means connecting said fluid device to said fluid pressure means which operates said cylinder, said compensating unit further comprising an external housing part and said cylinder further comprising a cylinder housing, said external housing part supporting said cylinder housing and said cylinder, when in a clamping position by one of said components of said compensating unit whereby fluid pressure in said cylinder can be completely released but said clamping force of said anchor against said object is maintained.

4,697,801

PARALLEL VICE

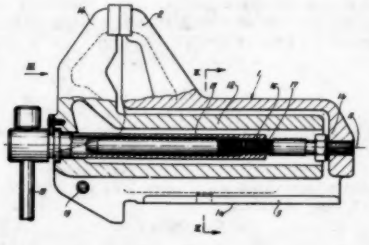
Adolf Wuerthele, Guntershausen, Switzerland, assignor to Gressel AG, Aadorf, Switzerland

Filed May 14, 1986, Ser. No. 863,217

Claims priority, application Fed. Rep. of Germany, May 14, 1985, 8514223[U]

Int. Cl.[4] B25B *1/10*

U.S. Cl. 269—100 **11 Claims**



1. A forwardly opening parallel vice comprising a housing adapted to be fixed to a workbench or the like and which carries a stationary clamping jaw and which has a quandrangu-

lar guide means, and a hollow slider which is displaceable in said guide means and which bears with a plurality of guide surfaces against guide tracks of said quadrangular guide means and carries said movable clamping jaw, and a screw spindle nut assembly which is provided in said slider, of which one part is mounted rotatably and axially immovably in said slider and the other part is fixed to said housing, said slider being of square cross-section standing on one of its corners and an axis of a screw spindle is arranged precisely at a center of said square cross-section, wherein said guide surfaces which are provided at the four sides of said slider and said guide tracks of said housing which co-operate with said guide surfaces form tangents to a common circle whose centerpoint is the axis of the screw spindle and wherein said guide surfaces and said guide tracks are inclined at an angle of 45° in each case relative to a base surface of said housing.

4,697,802

X-RAY DIAGNOSTICS INSTALLATION INCLUDING A TILTING TABLE

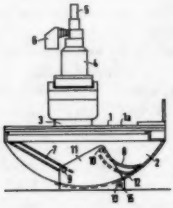
Rudolf Brendl; Alfred Hahn, both of Erlangen, and Karl Weiss, Buckenhof, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 29, 1986, Ser. No. 946,922

Claims priority, application Fed. Rep. of Germany, May 5, 1986, 3615187

Int. Cl.⁴ A61G *13/00*

U.S. Cl. 269—323 **3 Claims**



1. An x-ray diagnostics installation including a tilting table which is tiltable toward both sides out of the horizontal position, by 90° toward one side thereof, wherein said tilting table is secured to a table frame or support which is provided with arcuate drive paths at its outside, a drive wheel engaging thereinto, and whereby two guide rails are arranged at said table frame or support at each side thereof, two stationary guide pegs engaging into said guide rails in the horizontal position and said guide rails being fashioned and aligned such that, given adjustment of said tilting table out of said horizontal position, respectively one guide peg leaves its guide rail and the lower end of said table frame or support is raised to such degree that it lies above the floor level, comprising the improvement that the guide rail allocated to the foot end is curved toward a top of the table.

4,697,803

SHEET MEMBER FEEDING CASSETTE

Yuji Kan, and Hiroshi Iwaki, both of Hyogo, Japan, assignors to Sanyo Electric Co., Ltd.

Filed May 13, 1985, Ser. No. 733,622

Claims priority, application Japan, May 15, 1984, 59-97903; May 15, 1984, 59-71242[U]

Int. Cl.⁴ B65H *1/12*

U.S. Cl. 271—127 **13 Claims**

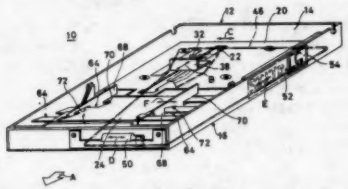
1. A sheet member feeding cassette comprising:

a main unit wherein sheet members to be fed are stored,

a first movable member which is installed in said main unit so as to be movable along the direction of feeding said sheet members and is for defining the rear edge of the sheet members to be stored therein,

a second movable member which is installed movably with respect to the main unit and whose position can be detected by detecting means installed outside said main unit, and

interlocking means for moving said second movable member to a predetermined position in response to the position of said first movable member, said interlocking means including coupling means for coupling said first movable member with said second movable member, said coupling means including cam means for converting the movement of said first movable member into the movement in the



direction orthogonal to the direction of the movement thereof, and said second movable member being coupled with said cam means, said first movable member being fixed to a pin extending in the perpendicular direction, said cam means including a long-arm lever supported rotatably by a shaft and a slit which is formed on the long-arm lever in a bent fashion and through which said pin is inserted, the lever having a rotary end, the rotary end of said lever being movable in the direction orthogonal to the direction of the movement of said first movable member in response to the movement of said first movable member, and said second movable member being coupled with the rotary end of said lever.

4,697,804

SHEET FEEDER FOR ROTARY PRINTING MACHINES

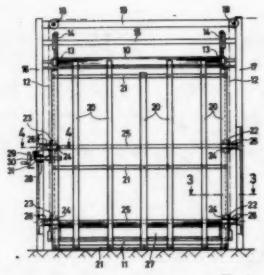
Gerhard Pollich, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation of Ser. No. 621,516, Jun. 18, 1984, abandoned. This application May 16, 1986, Ser. No. 865,581

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1983, 3321724

Int. Cl.⁴ B65H *1/00*

U.S. Cl. 271—162 **4 Claims**



1. Sheet feeder for rotary printing machines having a horizontally movable support for a sheet pile, stops for laterally adjusting the sheet pile and vertically disposed guide rails in a forward region of the sheet pile for engaging the leading edge of the sheets, comprising means for mounting the guide rails so

that they are freely movable laterally, and automatically follow a movement of the sheet pile, including strips connecting the guide rails to one another, the guide rails and said strips being jointly mounted via ball-bearing bushings on cross bars extending from side-to-side of the sheet feeder, and stop springs mounted on said cross bars at both ends thereof.

4,697,805

FOLDER WITH ROTATING GUIDE ROLLER AT FOLDING BLADE AND JAW CYLINDER EXIT

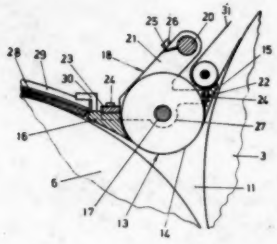
Rudolf Herb, Bobenheim, Fed. Rep. of Germany, assignor to Albert-Frankenthal AG, Frankenthal, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,200

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 3512308

Int. Cl.[4] B41C *1/04*

U.S. Cl. 270—47 **26 Claims**



1. A signature folder having at least one cylinder with at least one folding blade and holding devices for taking the signatures at their front edge, a further cylinder with folding jaws which cooperate with the folding blade of said folding blade cylinder during rotation of said cylinders, which cooperation defines a folding place for the signatures carried by said folding blade cylinder, means for rotating said cylinders, and a guide mechanism extending the length of said cylinders and disposed in the outlet wedge defined between said cylinders in the direction of rotation of said cylinders downstream from said folding place for guiding the parts of said signatures lying on the circumference of the folding blade cylinder and taken therefrom by the folding jaw of said folding jaw cylinder, the improvement comprising:

said guide mechanism including a middle part freely rotatable about an axis parallel to said cylinders and having an approximately cylindrically shaped surface, and stationary connecting parts having surface contours which run approximately tangentially into the surface of the middle part and which join said middle part at the sides thereof associated with the respective folding blade and folding jaw cylinders.

4,697,806

CONTROLLING METHOD FOR A SORTER

Tatumi Horiuchi, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 435,615, Oct. 20, 1982, Pat. No. 4,603,850. This application May 22, 1986, Ser. No. 856,633

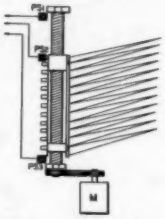
Claims priority, application Japan, Oct. 28, 1981, 76-173353

The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.

Int. Cl.[4] B65H *39/10*

U.S. Cl. 271—288 **3 Claims**

1. A sorting method for collating a plurality of copies corresponding to original documents comprising advancing a group of bins in a direction for collating a selected number of copies, returning the bins in an opposite direction for collating the same number of copies after the advancing movement, repeating the advancing and returning movements alternately, detecting a change of the selected number of copies during the



collating operation, and starting the collating operation from a specific standard bin in response to the detection.

4,697,807

NOVELTY GOLF BALL

Francis J. Boundy, 34 Brighton Crescent, Mt. Eliza, Victoria, Australia

Filed Apr. 16, 1986, Ser. No. 852,412

Claims priority, application Australia, Apr. 19, 1985, PH0224

Int. Cl.[4] A63J *5/02;* A63B *37/02, 37/12*

U.S. Cl. 272—27 N **8 Claims**

1. A ball having a unitary shell with an outer surface simulating a normal golf ball, said shell being formed of a material which is dimensionally stable under normal atmospheric conditions but which is adapted to break down into finely divided particles when struck by a golf club swing by a person during normal games play, the size of said finely divided particles being so small that the particles cannot be seen by the person swinging the golf club, said shell further defining at least one inner compartment housing a second material which expands upon being freed when said shell is struck and broken into said finely divided particles during normal games play.

4,697,808

WALKING ASSISTANCE SYSTEM

Paul F. Larson, New Orleans; Roy D. Douglas, Kenner, both of La.; Jerrold S. Petrofsky, Beavercreek, and Chandler A. Phillips, Tipp City, both of Ohio, assignors to Wright State University, Dayton, Ohio

Filed May 16, 1985, Ser. No. 734,945

Int. Cl.[4] A61N *1/36*

U.S. Cl. 272—70 **12 Claims**

1. A walking assistance system comprising:

left and right leg braces for supporting a handicapped person in a standing position, said braces being configured for restricting the legs of said person to forward and rearward movement,

interconnection means for causing forward movement of a nonweight bearing one of said braces in response to extension of a weight bearing opposite hip of said person

first and second stimulation means for stimulating controlled

contractions of the left and right hip extension muscles respectively of said person, and

control means for selective activation by said person to cause alternate operation of said first and second stimulation means and resultant steps defining a walking motion.

4,697,809

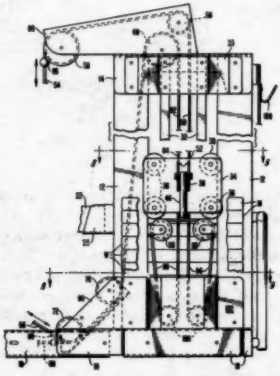
CABLE-OPERATED EXERCISER

Gary L. Rockwell, Auburn, Ala., assignor to Diversified Products Corp., Opelika, Ala.

Filed Oct. 16, 1985, Ser. No. 788,144

Int. Cl.[4] A63B *21/06*

U.S. Cl. 272—118 **16 Claims**



1. Physical exercising apparatus comprising:

a liftable carriage;

vertically extending carriage guide means for guiding the movement of said carriage;

resistance means operatively connected to said carriage for downwardly biasing and resisting lifting movement of said carriage; and

a plurality of alternately usable lifting means operatively connected to said carriage for lifting said carriage against said resistance means, said lifting means comprising:

a cable having an inner end operatively connected to said carriage, an outer end to which a lifting force can be applied by a user, and an intermediate portion between said inner and outer ends;

upper cable guide means adjacent to top of said carriage guide means for guiding said cable and defining therebeneath a vertical run of said cable along said intermediate portion;

outer cable stop means on said cable for limiting downward movement of said cable along said vertical run;

cable tensioning means connected to the inner end of said cable for tensioning and arresting the vertical run of said cable during lifting and lowering of said carriage by another of said lifting means; and

carriage engaging means on the inner end of said cable for engaging and lifting said carriage when a lifting force is applied to the outer end of said cable, said carriage engaging means allowing said carriage to freely move past the stationary vertical run of said cable when said carriage is lifted by another of said lifting means.

4,697,810

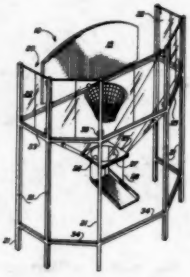
BASKETBALL TRAINING DEVICE

John W. Mathison, 8780 E. McKellips, Unit #116, Scottsdale, Ariz. 85257

Filed Aug. 28, 1986, Ser. No. 901,894

Int. Cl.[4] A63B *69/00*

U.S. Cl. 273—1.5 A **20 Claims**



20. A basketball training device adapted for use by a dsignated player used while practicing shooting a basketball at a designated hoop, said device comprising: a basket assembly including a base, a vertical support member mounted in said base, a backboard attached to said vertical support in spaced relationship to said base, a designated hoop secured to said backboard and extending outwardly therefrom, and a net depending from said hoop; a support means assembly disposed in spaced circumscribing relationship to said base; enclosure means attached to said support means and coacting with said backboard to define a space about said hoop, said enclosure means having a plurality of panels mounted therein in pivotal relationship to said support means, said panels being selectively pivotable between a first open and a second closed position to respectively permit or deny passage therethrough; collection means attached to and depending from said support means beneath said enclosure means to receive therein a basketball passing into and remaining within said space until drawn by gravity from said space; and adjustable return means operatively disposed beneath said collection means for receiving a basketball therefrom and directing said basketball to said designated player.

4,697,811

RACKET AND WEIGHT ATTACHMENT

Kunimasa Muroi, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jun. 20, 1985, Ser. No. 747,022

Claims priority, application Japan, Jun. 29, 1984, 59-134514; Jan. 11, 1985, 60-001957

Int. Cl.[4] A63B *49/04*

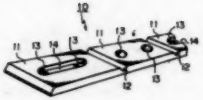
U.S. Cl. 273—73 C **9 Claims**

1. A racket for tennis and like games comprising

a substantially oval frame head with string holes for strings, said oval frame head having an outer periphery, and

at least one weight strap having an inner and an outer sur-

face, said weight strap being fastened, at a selected position, to the outer periphery of said frame head by the turn-over of a corresponding string in tension, said inner surface of said weight strap being proximate to said outer periphery of said frame head, said weight strap including at least two unit sections separated by a transverse notch, each said unit section including a pair of aligned through holes spaced apart from each other by a distance equal to a corresponding distance between adjacent said string holes, the thickness of said weight strap at the location of



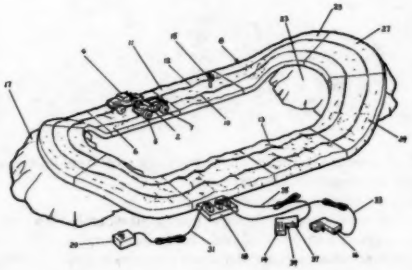
said notch being less than the thickness of said strap at locations other than the notch so as to facilitate separation of said weight strap into two unattached sections, the thickness being measured in a direction parallel to the axes of said through holes, said transverse notch being located at a position other than the position of a through hole, and at least one of said two unit sections including a longitudinal groove which is formed in said outer surface thereof whilst extending between said through holes for reception of said turn-over of said corresponding string.

4,697,812

OFF-ROAD SLOT CAR AND TRACK SYSTEM

Elliot A. Rudell, 2215 W. 237th St., Torrance, Calif. 90501; Joseph S. Cernansky, Lomita, and George T. Foster, Long Beach, both of Calif., assignors to Elliot Rudell, Torrance, Calif.

Filed Dec. 9, 1985, Ser. No. 806,489
Int. Cl.[4] A63F *9/14*; A63H *17/14, 18/12*
U.S. Cl. 273—86 B **56 Claims**



1. An electrically powered toy comprising:
(a) a toy vehicle chassis;
(b) an electric motor carried on said chassis;
(c) rotatable wheel means supported on said chassis and positioned thereon to support said toy in rolling contact with a track surface;
(d) power train means mechanically connecting said at least one wheel of said rotatable wheel means to said electric motor;
(e) a power supply post supported on said chassis for lateral side-to-side displacement thereon and projecting vertically beneath said wheel means by a distance from 0.5 to about 4 inches; '(f) first and second power wipers carried distally by said power supply post; and
(f) at least a pair of electrical leads, one each extending from a respective wiper along said post and in circuit to said electrical motor.

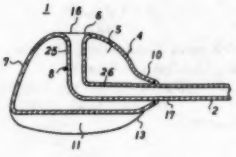
18. A toy track for motorized toy vehicles comprising:
(a) a running surface for said vehicles having a rough unpaved surface with bumps and undulations having inclinations of 5 degrees or greater and with abrupt changes from positive to negative inclines, thereby simulating an off-road environment;
(b) at least one slot in said running surface, conextensive therewith;
(c) opposite sides coextensive the length of said slot and extending beneath said slot a distance from 0.5 to about 4 inches;
(d) first and second electric conductor strips, one each positioned on a respective lateral side of each said slot.

4,697,813

GOLF CLUB

Shinsuke Inoue, 26-2, Ohaza Shiwa, Haki-cho, Asakura-gun, Fukuoka-ken 838-14, Japan

Filed Mar. 27, 1986, Ser. No. 845,100
Claims priority, application Japan, Apr. 1, 1985, 60-49053[U]
Int. Cl.[4] A63B *53/04, 53/02*
U.S. Cl. 273—167 H **12 Claims**



11. In a golf club having an elongated shaft provided with a club head fixed to the lower end thereof and a grip on the upper end thereof, comprising the improvement wherein:
said club head is defined by an outer shell-like wall formed by an outer tubular member which defines side surfaces of the club head and which projects inwardly to define a back surface of the club head, and a hollow tubular inner wall which is integral with said outer tubular member and projects from the middle of the back surface inwardly into the interior of the club head, said inner tubular wall and said outer tubular member being integrally and continuously joined by a smoothly curved annular portion disposed substantially at said back surface, and said inner tubular wall at a location spaced from said back surface being fixedly connected with the lower end of said shaft.

4,697,814

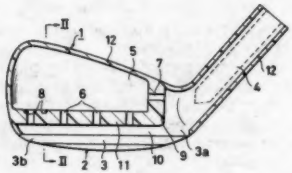
IRON CLUB HEAD

Magoichi Yamada, Saitama, Japan, assignor to Daiwa Golf Co., Ltd., Tokyo, Japan

Filed Apr. 1, 1986, Ser. No. 846,629
Claims priority, application Japan, Apr. 8, 1985, 60-51790[U]
Int. Cl.[4] A63B *53/04*
U.S. Cl. 273—169 **7 Claims**

1. An iron golf club head comprising a base metal body having a sole portion, there being a hosel portion continuous with said sole portion along the longitudinal direction thereof, a plurality of spaced support members provided on said base

metal body, a weight setting block supported by said support members in elevated relation to said sole portion, a fiber-reinforced synthetic resin member encasingly covering the weight setting block and a layer of fiber-reinforced resin synthetic material provided on the outer surface of said covered weight



setting block, there being a vertical space disposed between the weight setting block and the hosel portion of the base metal body, the support members defining a plurality of spaces between them through which extend fiber-reinforced synthetic material defining said fiber reinforced synthetic resin member.

4,697,815

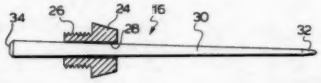
DART

Arthur J. McKenna, Mississauga, Canada, assignor to 139316 Canada Inc, Mississauga, Canada

Filed Jul. 25, 1986, Ser. No. 889,542

Int. Cl.[4] A63B *65/02*

U.S. Cl. 273—420 **3 Claims**



1. A dart comprising a main body having means at a forward end for receiving a point assembly and means at a rear end for receiving a tail, said point receiving means comprising a cavity extending rearwardly from a front end of the main body for a predetermined distance to an end wall, said point assembly comprising a collar detachably securable to the front end of the main body, said collar having an axially-extending aperture extending therethrough, and a point comprising an elongated shaft with a pointed front end, the shaft extending through the collar and having a forwardly tapering portion at least in the region of a rear end of the collar, said cavity having a side wall, and said shaft having lateral dimensions providing continous peripheral spacing between the shaft and the side wall of the cavity,

the forwardly tapering shaft portion engaging the rear end of the collar in a forward position of the point relative to the body to limit forward movement of the point relative to the body and permitting the body and collar to move forwardly relative to the point, when the point hits the target, to cause the cavity end wall to engage a rear end of the point shaft and drive the pointed front end into the target and to permit rotation of the body relative to the point about its longitudinal axis.

4,697,816

FRONT AND REAR WHEEL STEERING DEVICE

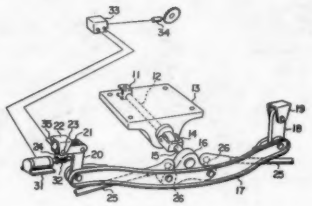
Yoshimichi Kawamoto; Yoshimi Furukawa; Tetsuro Hamada, and Mitsuya Serizawa, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1986, Ser. No. 822,043

Claims priority, application Japan, Jan. 24, 1985, 60-011837

Int. Cl.[4] B62D *5/06*

U.S. Cl. 280—91 **7 Claims**



1. A front and rear wheel steering device for vehicle for variably controlling the steering angle ratio of rear wheels relative to the steering angle of front wheels according to vehicle speed, comprising:

a vehicle speed sensor;

a selection means for selecting a mathematical function from a plurality of mathematical functions representing the steering angle ratio of the rear wheels according to the change rate of the vehicle speed; and

a rear wheel steering means for achieving a steering angle ratio corresponding to the selected mathematical function.

4,697,817

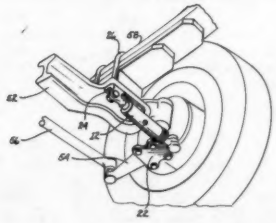
MOTOR VEHICLE STEERING STABILIZING APPARATUS

Paul Jefferson, 284 S. Dobson Rd., Chandler, Ariz. 85224

Filed Apr. 18, 1986, Ser. No. 853,544

Int. Cl.[4] B62D *7/08*

U.S. Cl. 280—94 **22 Claims**



12. A steering stabilizer apparatus for a motor vehicle, comprising in combination:

a piston-like member comprising:

a generally tubular hollow casing member having openings at both ends of said casing member;

internal shaft member disposed within said generally tubular hollow casing member and extending therefrom;

compression spring means surrounding said internal shaft member and disposed within said generally tubular hollow casing member for imparting resistive force to longitudinal movement of said internal shaft member;

spring seating means disposed within the inner circumference and at each end of said casing member for seating said compression spring means within said generally tubular hollow casing member and sealing each end of

said generally tubular hollow casting member, one of said spring seating means being disposed at a fixed end of said generally tubular hollow casing member and a second of said spring seating means having an aperture passing therethrough for receivably and rigidly connecting said generally tubular casing member to a motor vehicle, said second spring seating means being disposed at another end of said generally tubular hollow casing member; and

a plurality of spring retention means operably coupled to said internal shaft member, one of said spring retention means being operably coupled to the end of said internal shaft member which is disposed within said generally tubular hollow casing member and another of said spring retention means being operably coupled to a point along the length of said internal shaft member;

a connection arm member coupled to said internal shaft member;

a second connection arm member rigidly coupled to said second spring seating means; and

vehicle bracket means operably coupled to each of said connection arm member and said second connection arm member for attaching the steering stabilizing apparatus to a motor vehicle.

4,697,818

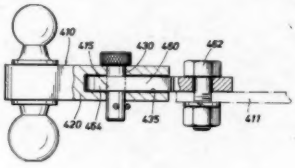
QUICK CHANGE TOWING HITCH

Gary W. Moore, 6503 Brittany Park La., Houston, Tex. 77066

Division of Ser. No. 623,571, Jun. 22, 1984, abandoned. This application Nov. 29, 1985, Ser. No. 803,511

Int. Cl.[4] B60D *1/06*

U.S. Cl. 280—415 A **2 Claims**



1. In combination with a towing vehicle including a hitch ball mounting portion incorporating a vehicle end mounted horizontal support member having spaced apart upper and lower surfaces including rear extremities interconnected by a rearwardly facing upstanding edge surface extending therebetween and wherein said support member includes a rear portion having an upstanding shank receiving opening formed therethrough forward of said edge surface and opening upwardly and downwardly, respectively, through said upper and lower surfaces, a quick change hitch for removable, reversible attachment to said mounting portion, said hitch comprising a horizontally elongated hitch body including front and rear portions, said rear portion including an upstanding ball mounting stud opening formed therethrough, a mounting stud extending and secured through said ball mounting stud opening and having upper and lower ends upon which upwardly and downwardly facing hitch balls, respectively, are mounted, said front portion defining a horizontal forwardly opening recess therein opening outwardly through said front portion, said hitch body being forwardly displaceable, in relatively inverted positions angularly displaced 180° apart about the longitudinal axis of said hitch body, into overlapping engagement with said horizontal support member from the rear thereof and with at least said rear portion of said support member having said shank receiving opening formed therethrough snugly received in and at least substantially seated in said recess, the portions of said front portion of said hitch body defining said recess having a pair of vertically registered retaining pin openings formed therethrough axially registered with said shank receiving opening, a retainer pin removably secured through said shank receiving and retaining pin openings, said recess opening only through the front portion of said hitch body with the sides of said hitch body being closed, said support member comprising a rearwardly projecting adaptor plate removably mounted from and overlap engaged with a horizontal flange portion of a rear mounted bumper on said vehicle.

4,697,819

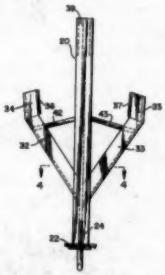
REMOVABLE DRAWBAR FOR TRAILERS

Michael Cascone, 181 Phillips Ave., South Hackensack, N.J. 07607

Filed Jun. 2, 1986, Ser. No. 869,308

Int. Cl.[4] B60D *1/14*

U.S. Cl. 280—491 E **21 Claims**



1. A drawbar device which is removably secured to a dump truck, with said drawbar device having the secured drawbar adapted to transfer a pulling force from an attached and towed and towable trailer to the frame of said dump truck, this drawbar device adapted for easy and quick removal before, during and after replacement positioning of the dump truck load body whose discharge end moves into the drawbar device when the load body is elevated and repositioned by associated lift means, said drawbar device including:

(a) a slide guide and retaining bracket conformed and disposed to be fixedly secured to the frame of the dump truck, this bracket positioned inward of the discharge end of the truck load body and, when secured, providing in said bracket a guideway of determined size and extent, this bracket having securing means at and with said guideway;

(b) spaced-apart, fixed support lug retainers fixedly secured to the frame of the dump truck, these lug retainers disposed intermediate the discharge end of the truck load body and the slide guide, and with the lug retainers arrayed so as to be substantially equal distance from a midpoint of the frame of the dump truck;

(c) a beam member portion of said device, with said beam member to be used in association with a dump truck to provide a strength member of metal and, when inserted into the guideway of the bracket and removably retained therein, providing force resisting means to the towing force of an attached trailer;

(d) a pair of substantially like divergent arms fixedly secured at one end to the beam member, and with the other end of each arm having means for removably securing said other and a distal end to a lug secured to the frame of the dump truck, each said other end, with the drawbar device in mounted condition, disposed to be brought to an adjacent relationship with support lug, and

(e) a front plate at the front end of said beam, providing means for selectively positioning and retaining a trailer hitch connector mounted thereon in a secured condition.

4,697,820

SKI

Keijiro Hayashi, Takatsuki; Kenzo Shinya, Gifu; Yasuo Saeki, Ohgaki, and Shigeru Asai, Gifu, all of Japan, assignors to Mizuno Corporation, Osaka, Japan

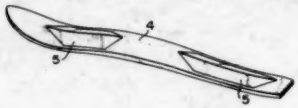
Filed Feb. 3, 1984, Ser. No. 576,740

Claims priority, application Japan, Feb. 4, 1983, 58-17992

The portion of the term of this patent subsequent to Oct. 6, 2004, has been disclaimed.

Int. Cl.[4] A63C 5/04

U.S. Cl. 280—609 7 Claims



1. A ski comprising:

a ski upper-surface constituting member provided with two openings having a predetermined shape, said two openings being spaced from each other and being entirely spaced inwardly from an outermost periphery of said ski upper-surface constituting member; and

two upper-surface projection members each including an upper-surface member and a reinforcing member underlying and in contact with said upper surface member, the rigidity of said two upper surface projection members being greater than the rigidity of said ski upper-surface constituting member and said two upper surface members each having an upwardly extending surface in the shape of a roof whose ridge is defined by the widthwise central portion thereof and that slopes downwardly and outwardly from a longitudinal center line of said ski, said upper-surface projection members have a periphery corresponding to and received in and substantially filling said two openings and secured into said two openings with said upwardly extending surface projecting outwardly therefrom and extending across a major portion of the width of the ski, thereby to form a roof-shaped upward projection on said upper-surface constituting member to provide improved rigidity.

4,697,821

SKI

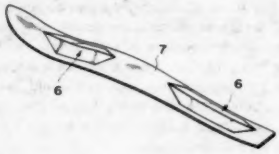
Keijiro Hayashi, Takatsuki; Kenzo Shinya, Gifu; Toshimi Awano, Ohgaki, and Shigeru Asai, Gifu, all of Japan, assignors to Mizuno Corporation, Osaka, Japan

Filed Feb. 3, 1984, Ser. No. 576,741

Claims priority, application Japan, Feb. 4, 1983, 58-17993

Int. Cl.[4] A63C 5/04

U.S. Cl. 280—609 8 Claims



1. A ski comprising:

an upper-surface constituting member positioned on an upper part of said ski provided with integral, elongated, longitudinally spaced, projections forward of and rearward of a ski binding mounting region and constituted by an upper surface member, and

a reinforcing member underlying and in contact with said upper surface member, each of said projections terminating at a point spaced inwardly from a respective end and side edges of said ski and extending upwardly from said upper surface constituting member and having the shape of a roof whose ridge is defined by the widthwise central portion of said ski and that slopes downwardly and outwardly from a longitudinal center line of said ski and extends across a majority of the width of the ski so that the ski is flexible as a whole and front and rear parts of the ski are high in torsional strength and flexural strength.

4,697,822

CONTROL ARRANGEMENT FOR RAISING AND LOWERING THE VEHICLE BODY OF AIR-SUSPENDED VEHICLES

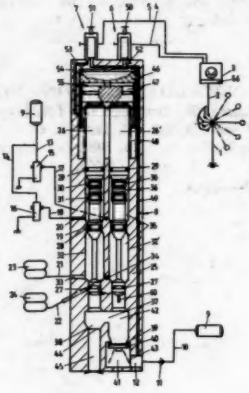
Rolanz Blanz, Heiligkreuzsteinach, Fed. Rep. of Germany, assignor to Graubremse GmbH, Heidelberg, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,857

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445579

Int. Cl.[4] B60G 17/04

U.S. Cl. 280—6 H 4 Claims



1. Control arrangement for the random raising and lowering of the vehicle body of air-suspended vehicles with leveling control, including a compressed air source, at least one leveling valve, air suspension bellows assigned to at least one vehicle axle which bellows can be connected to the compressed air source or a non-pressurized exhaust to adjust a specified distance between vehicle body and vehicle axle, and a switching valve with the designated positions Raise, Lower, Drive and Stop built into the pneumatic line connections of the leveling valves with the air suspension bellows or with the compressed air source and the non-pressurized exhaust, which switching valve has at least one sliding member controlled by two solenoid valves, either of which individually, or both simultaneously, may be non-energized or energized to provide an inactivated solenoid position and at least three activated-solenoid positions, whereby said sliding member has four respective positions within the switching valve, said control arrangement being characterized in that

(a) the Drive position is assigned to one of the solenoid-activated positions which locates the sliding member (26, 26') so as to connect the air suspension bellows (23, 24) with the leveling valves (15, 16), the Raise position is assigned another of the solenoid-activated positions which locates the sliding member (26, 26') so as to connect the air suspension bellows (23, 24) with the compressed air source (9), the Lower position is assigned to the third solenoid-activated position which locates the sliding member (26, 26') so as to connect the air suspension bellows (23, 24) with the non-pressurized exhaust, and the Stop position is assigned to the inactivated-solenoid posi-

tion whereby the sliding member (26, 26') is located so as to close off each of the pneumatic lines to the leveling valves (15, 16) and to the air suspension bellows (23, 24); and

(b) with a non-pressurized switching valve (8) and/or non-current carrying solenoid valves (6, 7) the sliding member (26, 26') of the switching valve (8) is configured such and is in such an inactivated position that, regardless of the designated position of the switching valve, the respective pneumatic lines (17, 18, 21, 22) from the switching valve (8) to the leveling valves (15, 16) on the one hand and to the air suspension bellows (23, 24) on the other hand are closed off.

4,697,823

MECHANISM FOR LOCKING OPENED AND CLOSED STATES OF BABY CARRIAGE

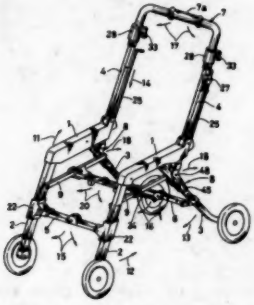
Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Filed May 16, 1986, Ser. No. 864,582

Claims priority, application Japan, Jul. 17, 1985, 60-109190[U]

Int. Cl.[4] B62B 7/06

U.S. Cl. 280—644 7 Claims



1. A mechanism for locking the opened and closed states of a baby carriage comprising:

a pair of rear legs extending rearwardly downward from the middle portion of the baby carriage,

a pair of support angle members each turnably connected at one of their respective ends to the middle portion of the baby carriage, whereby they are turnable to extend along the upper or lower halves of said rear legs,

a pair of push rods turnably connected at the lower ends thereof respectively to the middle portions of said support angle members,

a pair of sleeves axially slidably installed adjacent the lower ends of said push rods,

springs for urging said sleeves downward,

each said support angle member being formed at the other end thereof with an opened state locking-purpose engaging portion and at the middle portion thereof with a closed state locking-purpose engaging portion,

in the opened state of the baby carriage, each support angle member being positioned along the upper half of the rear leg while the other end of the support angle member is aligned with the associated push rod, and in order to lock this state, each said sleeve sliding downward to engage said open state locking-purpose engaging portion of the associated support angle member,

in the closed state of the baby carriage, each support angle member being positioned along the lower half of the associated rear leg while its middle portion intersects the push rod, and in order to lock this state, each said sleeve sliding downward to engage said closed state locking-purpose engaging portion,

said mechanism for locking the opened and closed states of a baby carriage being characterized in that:

the surface of said sleeve opposed to said support angle member is formed with a lock canceling-purpose engaging projection,

the support angle member is formed with first and second bulging walls bulging from said opened and closed state locking-purpose engaging portions,

the first and second bulging walls are respectively formed with opened and closed state canceling projections adapted to engage said lock canceling-purpose engaging projection on said sleeve escaping from said said opened and closed state locking-purpose engaging portions so as to temporarily retain the position of said sleeve on said push rod against the force of said spring.

4,697,824

DAMPING FORCE CONTROL DEVICE FOR VEHICLE DAMPER

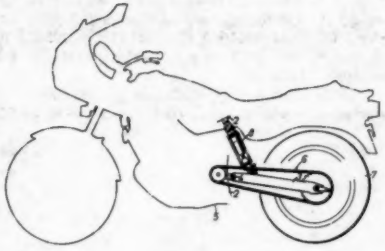
Tomoyuki Tagami, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 22, 1985, Ser. No. 801,144

Claims priority, application Japan, Nov. 22, 1984, 59-247624; Nov. 22, 1984, 59-247625

Int. Cl.[4] F16F 9/44; B60G 3/14

U.S. Cl. 280—701 4 Claims



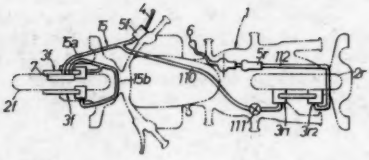
1. A damping force control device for a vehicle damper, the damper being interposed between a vehicle body and a wheel support arm supported swingably up and down on the body to support a wheel, the damper being provided therein with a damping force generating device, wherein said control device includes an adjusting member provided on said damper and adapted to adjust a damping force which is to be generated by said damping force generating device through an axial displacement of the member, said adjusting member and said wheel support arm being operatively connected to each other such that said adjusting member makes an axial displacement in response to a swinging movement of said wheel support arm, and an interlocking device interposed between the adjusting member and the wheel support arm, said interlocking device being rotatable in accordance with the swinging movement of said wheel support arm thereby to transmit a rotating motion of the interlocking device to said adjusting member as an axial motion.

4,697,825

ANTI-LOCK BRAKING SYSTEM FOR THE FRONT WHEEL OF A MOTORCYCLE

Tsutomu Hayashi, Tokyo; Takeshi Kawaguchi, and Tetsuo Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 783,348
Claims priority, application Japan, Nov. 6, 1984, 59-233967
Int. Cl.[4] B60G *21/00*; B62K *25/08*
U.S. Cl. 280—703 8 Claims



1. An anti-lock brake system for the front wheel of a motorcycle having a damped telescopic front fork, comprising

a brake master cylinder;

a front wheel brake;

an anti-lock control unit;

a brake line between said brake master cylinder and said front wheel brake, said anti-lock control unit being interposed in said brake line between said brake master cylinder and said front wheel brake; and

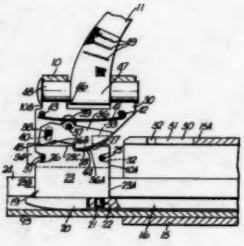
an anti-dive unit on the damped telescopic front fork responsive to applied braking force downstream of said master cylinder to increase damping force responsive to braking force.

4,697,826

LOCKING DEVICE FOR A BAND IN A SAFETY BELT OF A PASSIVE VEHICLE SAFETY BELT SYSTEM

Bengt O. J. S. Morner, Hovas, Sweden, assignor to Autoliv Development Aktiebolag, Vargarda, Sweden

PCT No. PCT/SE85/00016, § 371 Date Oct. 9, 1985, § 102(e) Date Oct. 9, 1985, PCT Pub. No. WO85/03262, PCT Pub. Date Aug. 1, 1985
PCT Filed Jan. 17, 1985, Ser. No. 789,967
Claims priority, application Sweden, Jan. 17, 1984, 8400199.9
Int. Cl.[4] B60R *21/00*
U.S. Cl. 280—804 11 Claims



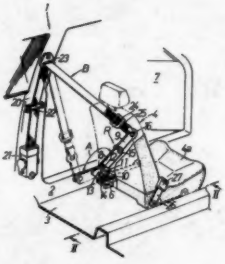
1. In a passive vehicle safety seat belt system including: a safety belt having at least one band; at least one movable fastening means for the band; a guide rail attached to a vehicle body for guiding each said movable fastening means; a power transmission means for moving each said movable fastening means along said guide rail; reversible motor means for driving the power transmission means for moving each fastening means forward and backward between a neutral position and a respective locking position; and a respective lock casing for each said fastening means which is attached to the vehicle body adjacent the guide rail at the respective locking position of the respective said fastening means and into which the respective said fstening means can be inserted and kept; the improvement wherein: each said fastening means is adapted to be released from said power transmission means when inserted into its respective said lock casing, and said power transmission means can continue its movement after release of the last fastening means and interruption of the power supply to said motor means, so that the kinetic energy accumulated in said reversible motor means can decay gradually during the continued movement of said power transmission means.

4,697,827

SEAT BELT DEVICE FOR A VEHICLE

Kiichi Sasaki, Wako; Hiroshi Tabata, Utsunomiya; Hisakazu Okuhara, Utsunomiya, and Kazuo Higuchi, Utsunomiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 767,531, Aug. 20, 1985, Pat. No. 4,643,449.
This application Sep. 29, 1986, Ser. No. 912,470
Claims priority, application Japan, Aug. 23, 1984, 59-175650; Aug. 23, 1984, 59-175651; Aug. 31, 1984, 59-182056
Int. Cl.[4] B60R *22/00*
U.S. Cl. 280—808 3 Claims



1. A seat belt device for a vehicle, comprising a front seat and a rear seat arranged within a compartment provided on one side o front seat so as to be swingable forwardly and rearwardly, a seat belt drawn out from a retractor and attached to a fore end of the reach arm, and a through-tang mounted on the seat belt and capable of being detachably connected to a buckle provided on another side of the front seat, wherein said reach arm is divided into a base arm pivoted on said one side of the front seat for swing motion toward back and forth and a fore arm mounted on the seat belt, said base arm and said fore arm being connected together so as to be foldable at a connection therebetween in the swinging direction of the reach arm, a restriction member being provided between said base arm and said fore arm for restricting said base and fore arms to assume a straight state when the arms are swung to an operative position forwardly of the front seat.

4,697,828

WELLHEAD BODY LOCKDOWN AND METHOD FOR ENGAGING SAME

Yung-Sen Chou, Houston, Tex., assignor to Armco Inc., Middletown, Ohio

Filed Nov. 26, 1986, Ser. No. 935,462
Int. Cl.[4] F16L *55/00*
U.S. Cl. 285—18 20 Claims

1. The combination comprising:

an annular suspension member having a through bore including a tapered camming shoulder merging into a mating surface, a tapered support shoulder and an upper stop surface,

an annular body having an outer mating surface and a tapered support shoulder, and

a preloaded connection having an actuating ring including an inner mating surface and an outer surface including a tapered camming surface,

said actuating ring disposed around said mating surface of said annular body,

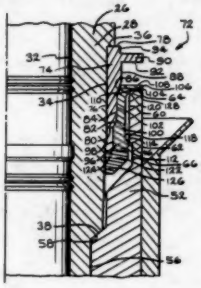
a split locking ring capable of being moved from a normally relaxed first condition to an expanded second condition,

said locking ring including a tapered inside camming surface,

said locking ring including a tapered cammimg shoulder on its outside surface which merges into a mating surface,

said locking ring including an upper and a lower stop surface,

said locking ring disposed between said actuating ring and said suspension member,



a retaining nut having a through bore and an upper stop surface,

said retaining nut being disposed around said annular body below said actuating and locking rings,

said retaining nut being connected to said annular body and positioned with said upper stop surface of said retaining nut in engagement with said lower stop surface of said locking ring so that said camming shoulder of said locking ring is slightly offset with respect to said camming shoulder of said suspension member when said locking ring is in said first condition,

said camming shoulder of said locking ring transferring a tensile force to said suspension member as said camming surface of said actuating ring is axially displaced relative to said camming surface of said locking ring when said locking ring is in said second condition.

4,697,829

PIPE CONNECTION JOINTS

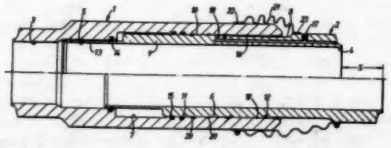
Richard J. Pond, Watledge, England, assignor to R J Pond Limited, Nailsworth, England

Filed Jul. 23, 1986, Ser. No. 888,402

Claims priority, application United Kingdom, Jul. 31, 1985, 8519279; Dec. 4, 1985, 8529895

Int. Cl.[4] F16L *55/00*

U.S. Cl. 285—18 **17 Claims**



1. A pipe connection joint comprising first and second coaxial tubular joint members, said joint members being in telescopic mutual engagement with an inner end portion of said first joint member surrounding an inner end portion of said second joint member so that the first joint member partially overlaps the second joint member, each of said joint members being adapted at an outer end for connection in a pipe-line and, over a cylindrical interface region disposed within an overlapped length of said second joint member, the second joint member being an interference fit within the first joint member, said interference fit providing a friction lock which prevents axial separation of the joint members when the joint is subject to internal working fluid pressure and also providing a seal against leakage from the joint, and an externally connectible duct which is formed in one of said joint members and terminates at said interface region, so that fluid under pressure can be introduced between said joint members at said interface region via said duct to relieve said friction lock to thereby allow relative telescopic movement of the joint members.

4,697,830

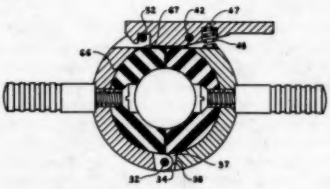
STABBING GUIDE

Kenneth M. Wood, and Frank Jarveaux, both of Houma, La., assignors to Petro-Tube, Inc., Houma, La.

Filed Dec. 31, 1984, Ser. No. 687,858

Int. Cl.[4] F16L *55/00*

U.S. Cl. 285—27 **13 Claims**



1. Stabbing guide apparatus comprising,

a generally cylindrical, axially elongated, vertically oriented guiding means having a first lower box engaging portion and having an integrally formed upper pin guiding portion, the guiding means being divided into two axially divided similar halves and constructed of polymeric material,

axially oriented hinge means positioned adjacent an axial division of the halves,

strap means having first and second generally similar and generally semicircular strap halves surrounding the halves of the guiding means, the hinge means being connected to the strap havles along adjacent axially extending edges thereof,

transversely oriented latch means diametrically opposite the hinge means adjacent the axial division between the halves of the guiding means and being connected to the strap halves,

handle means radially extending from the strap means at diametrically opposite positions spaced substantially equally from the hinge means and from the latch means, and

means for connecting the handle means to the strap means and for connecting the guiding means to the strap means.

4,697,831

PREFABRICATED ASSEMBLY FOR HIGH TENSILE STRENGTH PIPE CONNECTIONS

Alfred Thalmann, Uhwiesen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Switzerland

Filed May 28, 1986, Ser. No. 867,763

Claims priority, application Switzerland, Jun. 6, 1985, 2395/85

Int. Cl.[4] F16L *33/22*

U.S. Cl. 285—174 **5 Claims**

1. A prefabricated assembly for forming a high tensile

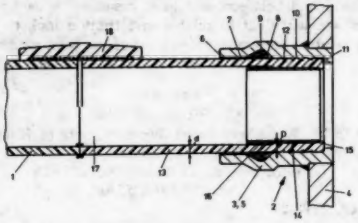
strength connection between a plastic material pipe and a metallic connecting piece comprising:

a metallic muff equipped with an elastic seal and having an inside diameter with projections extending therefrom;

a plastic pipe adapter having a pressed-in portion at a first end thereof pressed into said metallic muff, said pipe adapter including a second end opposite said first end, said pressed-in portion having an enlarged wall thickness;

said metallic muff being formed with an inner wall having a concave annular recess therein wherein said elastic seal is maintained pressed about the exterior of said pipe adapter;

a smooth support sleeve engaging at said pressed-in portion pressed into said inside diameter of said pipe adapter



which is stiffer with respect to said pipe adapter in order thereby to expand the diameter of said pipe adapter at the area where it is connected with said metallic muff to effect penetration into said pipe adapter of said projections on said metallic muff to form therebetween a positive and frictionally locking connection, said pipe adapter and said muff forming a prefabricated unit, said pressed-in portion having an intial underformed inside diameter which is smaller than an external diameter of said support sleeve; and

connection means forming a tight connection between said second end of said pipe adapter and said plastic material pipe for effecting connection of said prefabricated unit at a utilization site.

4,697,832

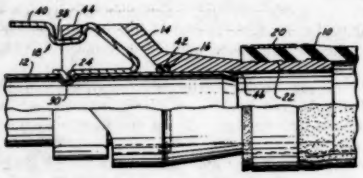
SNAP LOCK CONNECTOR

Gene D. Dickirson, London, United Kingdom, assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 18, 1986, Ser. No. 830,416

Int. Cl.[4] F16L *37/00*

U.S. Cl. 285—319 **4 Claims**



1. A coupling for connecting fluid carrying conduits comprising:

a connector body adapted for connection to one of the conduits including a latching bar directed transversely to the longitudinal axis of the conduits;

a tube adapted for sliding support within the connector body;

means for hydraulically sealing the adjacent surfaces of the connector body and the tube;

a spring latch fixed to the tube having a radially inclined surface contacted by the latching bar as the tube and connector body move toward a connected position, having means for releasably connecting the connector body and the tube; and

means for locating the angular and axial position of the spring latch at only one position with respect to the tube including multiple depressions on the surface of the tube, two of said depressions being located in a plane normal to the longitudinal axis of the tube, one of said depressions being spaced axially from said plane, at least one of said depressions in said plane being spaced angularly about the longitudinal axis of the coupling from another of said depressions and multiple protuberances formed on the spring latch located for engagement in the depressions of the tube.

4,697,833

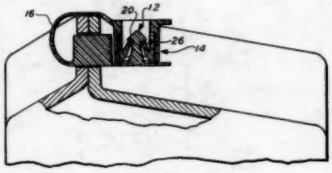
SECURITY SEAL

Allan W. Swift, 22 Edgewater Dr., Denville, N.J. 07834

Filed Oct. 23, 1985, Ser. No. 790,622

Int. Cl.[4] B65D *63/10*

U.S. Cl. 292—318 **6 Claims**



1. A security seal formed of a single piece of molded plastic and including a stud and a socket extending upwardly from a flexible strap and being shaped and dimensioned for locking non-separable engagement, said stud having an enlarged head with a rearwardly facing locking shoulder, said socket having an inner wall forming an opening for receiving the stud and means in the opening for receiving the enlarged head of the stud in locking engagement, and an outer wall disposed closely around the inner wall, said outer wall terminating in a distal end, said strap having a portion around the stud which is positioned to be contacted by the distal end of the outer wall when the stud and socket are engaged so as to thereby prevent tilting movement of the stud and socket in relation to each other and to restrict access to the locking means.

4,697,834

LAWN DEBRIS ACCUMULATION AND COLLECTION APPARATUS

Menzy Scott, 382 Valley Scent Avenue, Scotch Plains, N.J. 07076

Filed May 4, 1981, Ser. No. 260,326

Int. Cl.[4] B62B *11/00*

U.S. Cl. 294—55 **6 Claims**

1. An apparatus having a front end and a rear end comprising:

a guide-holder structure being located at the front end of said apparatus and defining a front opening which is perpendicular to the longitudinal direction of said apparatus, said longitudinal direction being defined as the front to rear direction; and

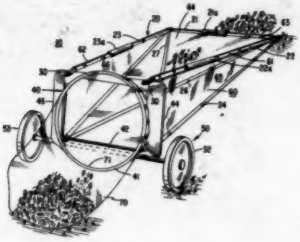
a frame structure being located at the rear end of said apparatus and including a base portion which is perpendicular to said opening, the rear end of said guide-holder structure being connected to the front end of said frame structure at first and second connection locations which are located along the plane of said base portion;

wherein said guide-holder structure further comprises:

a front annular member defining said opening and being perpendicular to said longitudinal direction;

a central cylindrical member being concentric with and being located at the rear end of said annular member; and

a plurality of guide members being located at the rear end of said cylindrical member and at the front end of said frame structure; first and second guide members being perpendicular to said base portion, the distance between the rear ends of said first and second guide members being greater



than the distance between the front ends, and third and fourth guide members being parallel to said base portion, said third guide member being located along the plane of said base portion, the connections between said guide-holder structure and said frame structure including said first and second connection locations and being located on said third guide member.

4,697,835

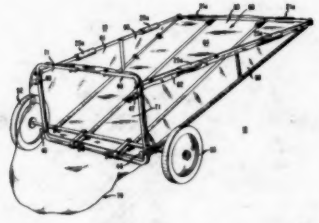
COMBINED LAWN DEBRIS RECEPTACLE-TARGET APPARATUS

Menzy Scott, 382 Valley Scent Ave., Scotch Plains, N.J. 07076

Continuation-in-part of Ser. No. 260,326, May 4, 1981. This application Mar. 16, 1982, Ser. No. 358,590

Int. Cl.[4] B62B *11/00*

U.S. Cl. 294—55 **7 Claims**



1. An apparatus having a front end and a rear end comprising:

a guide-holder structure being located at the front end of said apparatus and defining a front opening which is perpendicular to the longitudinal direction of said apparatus, said longitudial direction being defined as the front to rear direction;

a frame structure being located at the rear end of said apparatus, said guide-holder structure being connected to the front end of said frame structure and first and second connection locations;

a wheel-support structure being connected to said guide-holder structure by first and second connection means and connected to the front end of said frame structure at third and fourth connection locations.

4,697,836

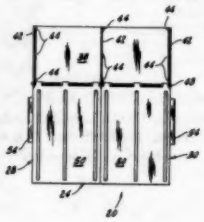
BIN WITH RETRACTABLE LID

Thomas A. Dutkanych, O'Fallon, Ill., assignor to Howard D. Hamilton and Laura M. Hamilton, both of O'Fallon, Ill.

Filed Aug. 1, 1986, Ser. No. 891,640

Int. Cl.[4] B65F *1/12*

U.S. Cl. 294—68.2 **17 Claims**



1. A bin for holding material and expelling it when the bin is inverted, the bin comprising:

a bottom;

a front wall, a rear wall, and two opposing sidewalls extending generally upwardly from the bottom, the sidewalls having a peaked top edge with an upwardly, rearwardly sloping front portion and a downwardly, rearwardly sloping rear portion;

a downwardly, rearwardly sloping top panel adjacent the rear wall and extending between the rear portions of the sidewalls;

the front wall, sidewalls, and top panel defining an upwardly, rearwardly sloping opening, the top panel channeling the contents of the bin out the opening when the bin is inverted;

at least one lid;

means for pivotally mounting the lid over the opening, the lid swinging open and depending downwardly when the bin is inverted, the mounting means including means for allowing the lid to slide relative to the bin in response to an applied force when the bin is inverted.

4,697,837

GRIPPER FOR TEXTILE LAYER OR THE LIKE

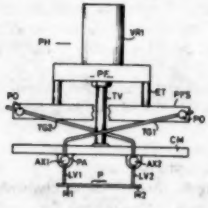
Jacques Fort, Darnieulles, France, assignor to Les Applications Industrielles Vosiennes ("S.A.P.I.V.O.G"), Darnieulles, France

Filed Jan. 21, 1986, Ser. No. 820,085

Claims priority, application France, Jan. 22, 1985, 85 00825

Int. Cl.[4] B25J *15/08*; B65H *3/00*

U.S. Cl. 294—88 **2 Claims**



1. Gripper useful for a textile machine unstacking device able to remove layer after layer from a textile mat stacking comprising tongs formed by two mobile jaws movable in angular movements, said jaws being fixed as to rotation with two shafts, said two shafts rotatable in bearings carried by a movable frame and said movable frame connected with a

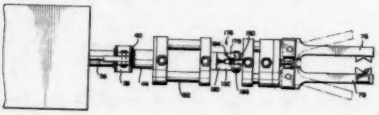
vertically extensible rod of a jack, whereby rotation of said two shafts can be caused by angular movement of a maneuvering part connecting each of said two shafts to a stationary plate fixed to said jack, wherein said maneuvering part is two crossing rods having each lower end thereof correspondingly fastened to one of said two shafts and each upper end thereof correspondingly slidably engaged with one of two rotating pins carried by said stationary plate.

4,697,838

ROBOT GRIPPING JAW OPERATOR

John F. Hartman, Box 50 Gardiner Rd., Apalachin, N.Y. 13732

Filed Jun. 10, 1985, Ser. No. 742,924
Int. Cl.[4] B25J *15/08*
U.S. Cl. 294—88 **30 Claims**



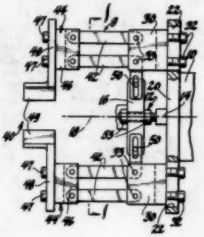
1. A robot gripper jaw assembly, comprising:
(a) support means comprising first and second spaced apart generally parallel plate means and each plate means including a front and a rear face;
(b) means extending between and secured to each of said plate means for maintaining said plate means spaced apart and generally parallel;
(c) jaw mounting means extending from said first plate means,
(d) a pair of cooperating jaw pivotally mounted to said mounting means for gripping work;
(e) said first plate means having a centrally disposed aperture therethrough;
(f) a cylinder and piston assembly comprising a first cylinder and a first piston aligned with said aperture and secured to and extending between said plate means;
(g) said first piston including a portion extending through said aperture and engageable with each of said jaws for pivoting said jaws;
(h) fluid supply means disposed in each plate means and communicating with said first cylinder for driving said first piston forwardly and rearwardly for causing pivoting of said jaws;
(i) said support means and said cylinder and piston assembly having a common rotational axis;
(j) means for simultaneously rotating said support means and said cylinder and piston assembly on said rotational axis;
(k) means for laterally shifting said support means and said cylinder and piston assembly relative to said rotational axis;
(l) a bracket including means for securing said bracket to a robot arm and first and second forwardly extending ears;
(m) said shifting means connected to said bracket and to said support means and cooperating with said bracket for shifting said support means;
(n) said shifting means extending betweens aid ears for causing said support means to shift therebetween;
(o) a second piston extending between said ears;
(p) a second cylinder displaceably mounted to said second piston and being connected to and carrying said support means; and,
(q) means being associated with said second cylinder for causing movement thereof on said second piston and thereby lateral shifting of said support means.

4,697,839

FLEXIBLE PART-CENTERING PNEUMATIC GRIPPER

Kurt F. Fischer, Oxford, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1986, Ser. No. 935,713
Int. Cl.[4] B25J *15/10*
U.S. Cl. 294—115 **8 Claims**



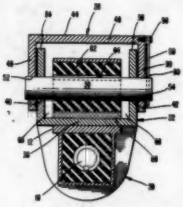
1. An adjustable workpiece centering end of arm tooling gripper adapted to be connected with a robot arm to grab a workpiece, said gripper in combination comprising:
a plate having a plurality of slots;
an actuator adjacent said plate having rod means extendible with respect to said plate;
a plurality of mounting guides locationally adjustably respectively fitted with said slots of said plates;
a quadrangular linkage member pivotally connected with each of said mounting guides and being pivotally and slotably connected with said rod means;
a finger pivotally connected with each of said quadrangular linkage members whereby movement of said rod means causes said fingers to grab and locate the workpiece with respect to said rod means.

4,697,840

SNUBBER DEVICE FOR PARALLELOGRAM GRAPPLE

Michael Duncan, Wamego, Kans., assignor to Balderson Inc., Wamego, Kans.

Filed Jul. 21, 1986, Ser. No. 887,203
Int. Cl.[4] B66C *1/00;* **F16F** *1/16*
U.S. Cl. 294—119.4 **7 Claims**



1. In a snubber device, the combination comprising: a first assembly having a first U-shaped member and a second U-shaped member, the first member provided with first flange sections and a first base section, the flange sections extending substantially perpendicular to the base section; the second member provided with second flange sections and a second base section; the second flange sections positioned interiorly of the first flange sections and connected with the first flange sections by a pin member extending through openings provided in each of the flange sections; a first elastomeric member positoned interiorly of the second flange sections and connected to the pin member; a second assembly including an integral housing having a base member with an interior perime-

ter of the housing being substantially square and having a second elastomeric member received in and bonded to the interior perimeter; an opening provided in the second elastomeric member; an additional pin member received in the opening and lockingly engaged with the second elastomeric member; the second assembly directly connected to the second base section so as to prevent relative movement therebetween.

4,697,841

ADHESIVE CONNECTION ARRANGEMENT FOR A WINDSHIELD HELD ON A BODY OF A MOTOR VEHICLE

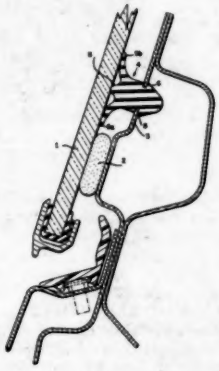
Norbert Klein, Sindelfingen; Jochen Pärisch, Herrenberg, and Gerhard Zweigart, Aidlingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed May 7, 1986, Ser. No. 860,566

Claims priority, application Fed. Rep. of Germany, May 7, 1985, 3516345

Int. Cl.[4] B60J *1/02*

U.S. Cl. 296—84 R **7 Claims**



1. Positioning means for positioning a windshield of a motor vehicle a predetermined distance from a body of the motor vehicle during hardening of an adhesive means, said adhesive means being also positioned between the windshield and the body, wherein said positioning means comprises suction means fixed to the body of the motor vehicle.

4,697,842

FRONT COVER FOR SMALL-SIZED VEHICLES

Katsuyoshi Kawasaki, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 410,924, Aug. 24, 1982, abandoned. This application Jun. 24, 1986, Ser. No. 879,545

Claims priority, application Japan, Aug. 28, 1981, 56-135962; Aug. 28, 1981, 56-135960; Aug. 28, 1981, 56-128276[U]; Sep. 11, 1981, 56-135078[U]; Apr. 20, 1982, 57-065722; Apr. 20, 1982, 57-065723

Int. Cl.[4] B62J *17/02, 7/06;* B60R *5/02*

U.S. Cl. 296—78.1 **10 Claims**

1. In a small-sized vehicle having at least one front wheel, a steering mechanism for steering said front wheel and a steering support which supports said steering mechanism, a front cover device comprising:

a leg shield member which covers the front and lateral sides of said steering support;

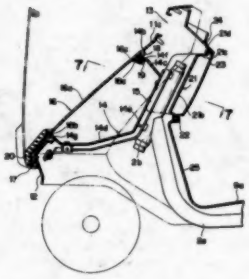
a first compartment defining a first goods accommodating space within said leg shield member;

said first accommodating space being disposed on the front side of said steering support;

said leg shield member including a lid member which forms part of a front portion of said leg shield member and is adapted to open and close from the front of said first accommodating space;

a headlight is supported on said leg shield and disposed at the upper portion of said leg shield;

said lid member is adapted to remain in a substantially vertically erect position when open;



said lid member is pivotably secured at the lower end portion thereof to said front portion through at least one hinge mechanism; and

said vehicle is provided with at least one bumper, said bumper comprising an elastic member mounted so as to cover said hinge mechanism, whereby said bumper comprises a forwardmost projection of said front cover device.

4,697,843

ANTI-GLARE DEVICE FOR MOTOR VEHICLES

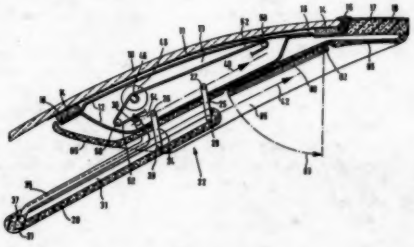
Johann Tomforde, Sindelfingen, Fed. Rep. of Germany, assignor to Daimler-Benz, Stuttgart, Fed. Rep. of Germany

Filed Nov. 25, 1986, Ser. No. 934,869

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1985, 3441902

Int. Cl.[4] B60J *3/02*

U.S. Cl. 296—97 G **19 Claims**



1. Anti-glare device for motor vehicles with at least one sun visor arranged on the under-side of a hollow transverse roof beam located in the region of the windscreen, which device is displaceable from a basic position, in which the sun visor is located approximately below the transverse roof beam, into an extended position, in which the sun visor projects into the region of the windscreen, wherein one guide lever means coupled to the sun visor, is provided as a guide linkage for the sun visor, wherein the guide lever means is articulately connected within a cavity of the transverse roof beam, and wherein a drive means arranged in the cavity is provided which is connected to the sun visor via at least one displacing lever.

4,697,844

MEANS AND METHOD FOR REDUCING THE OPERATIVE HEIGHT OF THE FIFTH WHEEL OF A TRUCK TRACTOR

William L. Giles, Des Moines, Iowa, assignor to Ruan, Incorporated, Des Moines, Iowa

Filed Jun. 28, 1985, Ser. No. 749,658
Int. Cl.[4] B62D *53/08*
U.S. Cl. 296—203 **11 Claims**

1. A truck tractor fifth wheel framework for reducing the operative height of the fifth wheel of the truck tractor from its original conventional fifth wheel supporting height comprising:

a pair of spaced apart, generally parallel frame rail members each having horizontally disposed top and bottom walls connected by at least one vertical side wall, said top, bottom and side walls defining a rail channel, said top walls defining the orignal, conventional fifth wheel supporting height;

each said frame rail member having along its length a fifth wheel supporting portion with a top wall being lower in height than the top wall of any other portion of said frame rail member so that said fifth wheel of said truck tractor is mountable upon said top wall of said fifth wheel supporting portion at a reduced height from said conventional fifth wheel supporting height, said bottom wall of said fifth wheel supporting member portion being integral with and at the same height as the bottom wall of any other portion of said frame rail member;

said fifth wheel supporting portion being formed by a lower rail section and an upper rail section, the upper rail section including the top wall and a part of the side wall of the fifth wheel supporting portion severed along a splice line from said fifth wheel framework and having had a lower part of said side wall cut away and removed, said upper section being replaced upon and spliced to the lower rail portion without the lower part of the side wall which has been cut away and removed, thereby lowering the operative height of the fifth wheel from the conventional fifth wheel supporting height;

interconnecting cross support means between said frame rail members; and

support means operatively incorporated with said fifth wheel supporting portion to increase strength and rigidity of said fifth wheel supporting portion of said frame rail member.

4,697,845

LONG-RUNNING MOTOR-DRIVEN BABY SWING

Gordon W. Kamman, Elma, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

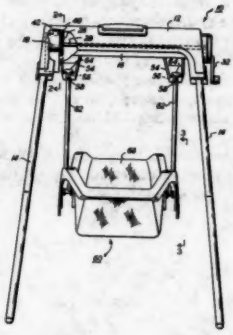
Filed Aug. 2, 1985, Ser. No. 762,132
Int. Cl.[4] B60N *1/02*; A47C *1/00*
U.S. Cl. 297—118 **9 Claims**

1. A dual purpose baby seat for use in combination with a frame and motor means for forming a motor driven swing, or as a seat for supporting a baby in a reclining position comprising

a chair means having seat and back portions; pivot means on the chair means;

elongated leg means attached to said pivot means;

positioning means for fixing said leg means in a plurality of swinging positions wherein said leg means extends generally above said chair whereby said chair means can be swingingly suspended from said frame by said leg means to function as a swing, and in a second seating position wherein said leg means extends generally rearwardly behind at least the back portion of said chair means whereby said chair means is at least partially supported in a reclining position by said leg means to



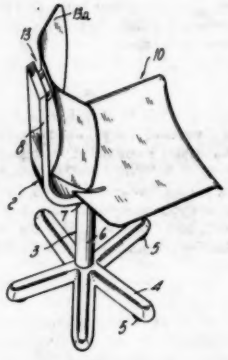
function to support a baby; and first latch means for holding said leg means in a selected one of said plurality of swinging positions or in said seating position, and second latch means for allowing said leg means to be moved from said swinging positions to said seating position and preventing movement from said swinging positions to said seating position except when said second latch means are released.

4,697,846

ADJUSTABLE CHAIR

Roberto Lucci, and Paolo Orlandini, both of Milan, Italy, assignors to Fantoni Arredamenti S.p.A., Osoppo, Italy

Filed Dec. 12, 1985, Ser. No. 808,334
Claims priority, application Italy, May 8, 1985, 20614 A/85
Int. Cl.[4] A47C *3/00*
U.S. Cl. 297—298 **3 Claims**



1. An adjustable chair structure, comprising:

a support frame carried on a base and having a substantially L-shape with a substantially horizontal arm and an upright arm,

a composite seat body carried by said L-shape support frame, said composite seat body comprising a seat part and a seat back,

means slidably carrying said seat part of said composite seat body on said substantially horizontal arm of said L-shape support frame,

a carrier pivotally supporting said seat back and freely slidably guiding it on said upright arm of said L-shape support frame such that adjustment of the position of said seat part of said composite seat body causes a corresponding free adjustment in the position of said seat back of said composite seat body along said upright arm,

said seat part of said composite seat body having longitudinal ribs on its under face slidably engaged in longitudinal recesses formed on said substantially horizontal arm of said L-shape support frame, said seat part further having a lateral flange engageable over the lateral edges of said substantially horizontal arm, and

a flexible projection extending from the middle of the rear edge of said seat part of said composite seat body and provided with a plurality of coupling resilient ridges for adjustable connection with said carrier of said seat back whereby to determine the mutual positioning between said seat part and said seat back.

4,697,847

PORTABLE UPHOLSTERED FURNITURE

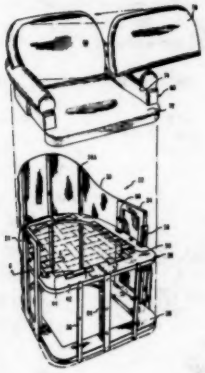
Herbert Herschlag, 68-15 Groton St., Forest Hills, N.Y. 11375

PCT No. PCT/US85/00765, § 371 Date Dec. 30, 1985, § 102(e) Date Dec. 30, 1985, PCT Pub. No. WO85/05019, PCT Pub. Date Nov. 21, 1985

Continuation-in-part of Ser. No. 605,564, Apr. 30, 1984, Pat. No. 4,632,459. This PCT application Apr. 30, 1985, Ser. No. 814,625

Int. Cl.[4] A47C *7/00*

U.S. Cl. 297—440 **25 Claims**



1. Portable upholstered furniture defined by a laterally foldable frame having a pair of laterally collapsible side frames and a pair of medially foldable parallelogram cross assemblies extending therebetween, means providing lateral support to said frame, a cushioned bonnet like upper assembly setable downwardly onto said frame and at least one vertically extending strut member supporting at least one of said cross assemblies.

4,697,848

SEATBACK SPRING DEVICE FOR AUTOMOBILE

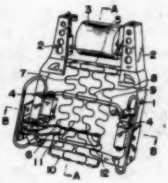
Takemi Hattori, Kariya, and Reiki Kawamura, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Apr. 24, 1986, Ser. No. 855,339

Claims priority, application Japan, Apr. 26, 1985, 60-088954

Int. Cl.[4] A47C *7/02*

U.S. Cl. 297—460 **7 Claims**



1. A seatback spring device for automobiles comprising a pair of side spring elements and at least one intermediate spring element of wave-like form, said spring elements being continuous in a basically longitudinal direction, said spring elements being laterally juxtaposed and linked with a seat-back frame, the side spring elements being twisted at upper and lower ends thereof so that the intermediate outer sides of said elements are displaced forwardly and toward said intermediate spring element, and said intermediate spring element protruding away from said frame at a level corresponding to the waist of an occupant.

4,697,849

CHILD'S HIGH CHAIR RESTRAINING DEVICE

Suzann Smith, 8483 Holly, Canton, Mich. 48187

Continuation of Ser. No. 737,323, May 23, 1985, abandoned. This application Jan. 5, 1987, Ser. No. 412

Int. Cl.[4] A62B *35/00*

U.S. Cl. 297—485 **2 Claims**

2. The combination comprising:

a child's high chair having a back supporting frame and a seat for supporting a child having a first leg and a second leg;

a one-piece, continuous elongated first strap having a first end and a second end, and stitch means intermediate said ends forming a first loop in the first strap;

a pair of cooperating buckle elements mounted on the first strap, the buckle elements including a buckle tongue, and a buckle housing for releasably receiving the tongue, one of said buckle elements having opening means receiving the first strap loop, the other of said buckle elements being mounted on the first strap between the first loop and the first end of the first strap, the buckle tongue being engageable with the buckle housing to form a second loop in the

first strap for embracing the upper end of a first leg of the child;

cooperating hook and loop fastener means mounted on the first strap between the first loop and the second end of the first strap, and being engageable together to form a third loop smaller than the second loop, for embracing a portion of the back supporting frame of the high chair to limit motion of the child's first leg away from the back supporting frame;

a one-piece, continuous, elongated second strap having a first end and a second end, and stitch means intermediate said ends forming a first loop in the second strap;

a pair of cooperating buckle elements mounted on the second strap, the buckle elements including a buckle tongue and a buckle housing for releasably receiving the tongue, one of said buckle elements having opening means receiving the first loop of the second strap, the other of said buckle elements being mounted on the second strap between the first loop and the first end of the second strap, the buckle tongue being engageable with the buckle housing to form a second loop in the second strap for embracing the upper end of the second leg of the child; and

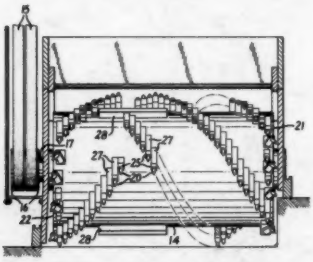
cooperating hook and loop fastener means mounted on the second strap between the first loop and the second end of the second strap, and being engageable together to form a third loop smaller than the second loop, for embracing a portion of the back supporting frame of the high chair to limit motion of the child's second leg away from the back supporting frame.

4,697,850

CUTTER DRUM FOR PAVEMENT PROFILER

Eskil Tuneblom, Mount Arlington, N.J., assignor to Dynapac Mfg. Inc., Stanhope, N.J.

Filed Feb. 6, 1986, Ser. No. 827,273
Int. Cl.[4] E21C *35/18*
U.S. Cl. 299—87 **6 Claims**



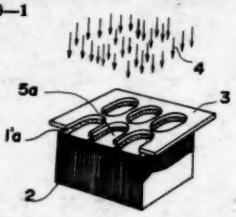
1. A cutter drum for a pavement profiler comprising a drum, mounting bases welded to the drum surface in a selected spiral-like configuration with a portion of one base overlapping a portion of an adjacent base, tooth holders associated with the mounting bases, a cutting tooth removably held by each tooth holder, a bolt extending through the overlapping base portions and one of the associated tooth holders to secure the holder to the bases, complementary and engaging surfaces on each of the tooth holders and an adjacent one of the bases, the complementary and engaging surfaces being located on the side of the tooth holder opposite to the tooth so that the forces acting on the tooth during cutting operations are resisted by the adjacent base.

4,697,851

METHOD OF MANUFACTURING FIBER BUNDLES FOR USE IN BRUSHES

Yasuo Takahashi, Yokohama, Japan, assignor to Shinwa Seisakusho Co., Ltd., Yokohama, Japan

Filed Nov. 5, 1986, Ser. No. 927,540
Claims priority, application Japan, Nov. 19, 1985, 60-257661
Int. Cl.[4] A46D *1/00*; A46B *9/04*
U.S. Cl. 300—1 **16 Claims**



1. A method for manufacturing a final fiber bundle for use in brushes which comprises the steps of:

(a) arranging a number of synthetic thermoplastic fibers in such a manner that at least one end of each of the fibers is positioned in the same plane, to obtain a fiber bundle,

(b) compressing the thus arranged thermoplastic fibers to the extent that the resulting compressed fiber bundle takes a predetermined cross-sectional shape and the bulk density thereof reaches a predetermined one, whereupon the fiber ends in the same plane seem to constitute an end surface of the fiber bundle,

(c) irradiating said end surface of the bundle with energy beams to fusion bond the compressed fiber ends together in the end surface, and

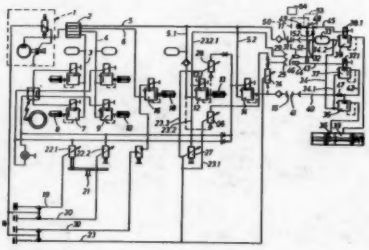
(d) releasing said compression to obtain a final fiber bundle having a fusion bonded layer.

4,697,852

SPRING-LOADED PARKING BRAKE AND SERVICE-BRAKE SYSTEM FOR TRAILERS

Helmut Scholz, Bischweier, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 21, 1986, Ser. No. 831,555
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506418
Int. Cl.[4] B60T *13/38, 13/68*
U.S. Cl. 303—7 **17 Claims**



1. A parking brake and service brake system for a motor vehicle and a trailer towed by said motor vehicle, comprising:

a service brake in said motor vehicle;

a service brake and a spring-loaded parking brake in said trailer;

said service brakes being actuable in response to an electrical service brake signal, and said parking brake being actuable in response to an electrical parking brake signal;

pressure-medium supply means for supplying a pressure-medium;

fluidic supply coupling means for providing a first fluid coupling of said motor vehicle and said trailer;

fluidic control-line coupling means for providing a second fluid coupling through wnich a first fluidic control signal from said vehicle to said trailer is supplied;

trailer control valve means for supplying a controlled amount of said pressure medium to said trailer service brake in response to said first fluidic control signal, said trailer control valve means being fluidly connected to said control-line coupling means and said trailer service brake;

first electrical trailer coupling means or transmitting said service brake signals between said vehicle and said trailer;

pilot valve means for supplying a second fluidic control signal to said trailer control valve means in response to said service brake signals from said first electrical coupling means, said pilot valve means being fluidly connected to said trailer control valve means and electrically connected to said first electrical coupling means;

a parking brake in said motor vehicle; second electrical trailer coupling means for transmitting said parking brake signals between said vehicle and said trailer;

trailer parking brake valve means for supplying said pressure medium to said trailer parking brake in response to said parking brake signals from said second electrical coupling means, said trailer parking brake valve means being fluidly connected to said trailer parking brake, and electrically connected to said second electrical trailer coupling means;

storage vessel means attached to said trailer and fluidly connected to said fluidic supply coupling means and said trailer parking brake valve means for supplying said pressure medium to said trailer parking brake and said trailer service brake;

means for generating said electrical signals transmitted by said second electrical trailer coupling means when at least one of said parking brake of said motor vehicle is actuated and a radom electrical signal is generated; and

means for generating said fluidic control signal when said service brake of said vehicle is actuated;

wherein said pressure-medium is air.

4,697,853

PRESSURE-MEDIUM BRAKING SYSTEM FOR VEHICLES

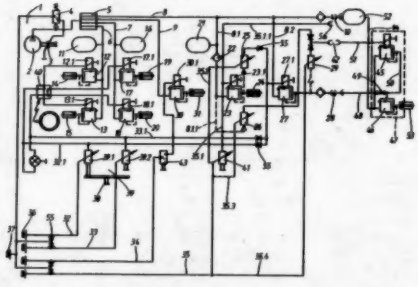
Helmut Scholz, Bischweier, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 21, 1986, Ser. No. 831,556

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506419

Int. Cl.⁴ B60T *13/68, 17/04*

U.S. Cl. 303—7 **18 Claims**



1. A multiple circuit pressure-medium braking system for vehicle and trailer combinations, comprising:

plurality of pressure-medium circuits;

pressure-medium supply means for supplying a pressure-medium;

a plurality of additional batteries, wherein each of said plurality of electrical circuits includes a primary vehicle battery and at least one additional battery connected in parallel with said primary vehicle battery;

a plurality of electrical circuits, each of said electrical circuits controlling the flow of said pressure-medium in a corresponding one of said pressure-medium circuits;

a multi-circuit safety valve means for controlling the supply of said pressure-medium to said pressure-medium circuits;

trailer brake valve means controlling the supply of said pressure-medium to a brake cylinder of said trailer;

trailer control valve means fluidically connected to said trailer brake valve means for fluidically controlling the operation of said trailer brake valve means; and

variable resistor means connected to said trailer brake valve means for electrically controlling the operation of said trailer brake valve means;

wherein said trailer control valve means fluidically controls the actuation of said variable resistor means for electrically controlling said trailer brake valve means.

4,697,854

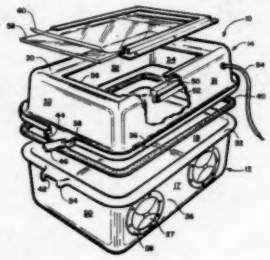
PORTABLE ENCLOSED HYGENIC WORKSTATION

Thomas J. Lunsford, 1215 Pioneer Way, El Cajon, Calif. 92020

Filed Oct. 25, 1985, Ser. No. 791,590

Int. Cl.⁴ B65O *6/00*

U.S. Cl. 312—223 **6 Claims**



1. A portable enclosed hygienic workstation for sanding greenware castings therein comprising:

a box-like housing having a bottom wall, a front wall, a rear wall, and a pair of laterally spaced side walls, said walls forming a work chamber within them, said housing being molded from plastic material having means exhibiting static properties that attract dust particles created during the sanding of greenware casting, the top edge of said front wall, rear wall, and laterally spaced side walls have an outwardly flange that extends around the periphery of these walls to form a surface for mating with a sealing gasket;

means in said front wall for allowing insertion of a pair of hands into said work chamber comprising a pair of laterally spaced hand holes, each of said hand holes having a flexible flap member covering said hand hole;

a top cover for said box-like housing is removably secured to the upper portions of the front, rear, and side walls of said box-like housing, said top cover having a top wall, a front wall, a rear wall and a pair of laterally spaced side walls, said walls forming an upper chamber area within them, said top cover being molded from plastic material having means exhibiting static properties that attract dust particles created during the sanding of greenware castings, the bottom edge of said front wall, rear wall and laterally spaced side walls have an outwardly extending flange that extends around the periphery of these walls to form a surface from mating with a sealing gasket;

a gasket positioned between the respective flanges of said box-like housing and said top cover for preventing powder and dust from escaping from the work chamber of said enclosed hygenic workstation, quick release latch means on said respective flanges for holding said box-like housing and said top cover together;

a cutout window is formed in the top wall of said top cover so that a person performing work in said work chamber with their hands can view the work being performed;

a transparent window pane covering said cutout window, said window pane being formed of material having means exhibiting anti-static properties that repel dust particles created during the sanding of greenware castings; and

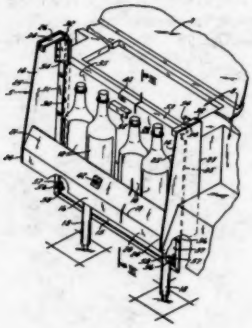
a florescent lighting fixture mounted in the upper chamber area within said top cover.

4,697,855

BOTTLE TROUGH SECURITY DEVICE

Theodore R. Lecher, Brookfield, Wis., assignor to The Perlick Company, Inc., Milwaukee, Wis.

Filed Jun. 9, 1986, Ser. No. 871,780
Int. Cl.[4] A47B *81/00*
U.S. Cl. 312—290 **2 Claims**



1. A bartender's bottle trough for holding a row of bottles containing liquor or the like at an elevation above floor level such that they are normally readily accessible from above and in front of the bottle trough, said bottle trough comprising a pair of opposite upright end walls, each having a front edge and a substantially vertical rear edge, an elongated bottom wall extending lengthwise between said end walls and upon which bottles can be supported, and an elongated upright front wall extending lengthwise between said end walls and having an upper edge at a distance above said bottom wall which is substantially smaller than the height of a bottle, said bottle trough being characterized by:

A. channel means on each end wall defining a groove extending along the rear edge of the end wall and opening towards the other end wall;

B. supporting means on the top of each end wall defining an upwardly facing surface which projects no more than a small distance towards the other end wall;

C. cover means movable to and from a closed position cooperating with said walls to prevent access to bottles in said bottle trough.

(1) said cover means comprising

(a) elongated front, medial and rear panels, each having a length to extend between said end walls and having a pair of opposite longitudinal edges,

(b) a first hinge connection between said medial panel and said front panel, extending along a front longitudinal edge of said medial panel and an upper longitudinal edge of said front panel, and

(c) a second connection between said medial panel and said rear panel, extending along a rear longitudinal edge of said medial panel and an upper longitudinal edge of said rear panel,

(2) said panels being of such width between said longitudinal edges of each that with the cover means in its closed position,

(a) the medial panel overlies and is supported with its surface horizontal by said supporting means, to extend across bottles on the bottom wall,

(b) the front panel extends down from the medial panel to near said upper edge of the front wall, and

(c) the rear panel, with opposite end portions received in said grooves, extends down from said medial panel partway to the level of said bottom wall,

said hinge connections enabling the front and medial panels to be swung up into coplanar relationship with the rear panel and the entire cover means to be slid down in said grooves to an out-of-the-way position in which the front panel is behind bottle on the bottom wall;

D. cooperating securement means on said front panel and on one of said walls providing for locking the cover means in its closed position;

E. a pair of abutment means, one on each end wall, each defining a downwardly facing abutment that is forwardly adjacent to the groove in its end wall; and

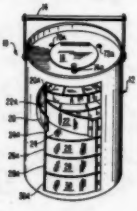
F. a pair of abutment elements on said rear panel, one for each of said abutment means, each located near an end of said rear panel, each said abutment element having a portion defining an upwardly facing abutment which is engageable with its abutment means when said rear panel is at a predetermined upper position wherein said medial panel overlies said supporting means, to thus prevent upward disengagement of the rear panel from said grooves, and each said abutment element being mounted on the rear panel for movement of its said portion relative to that panel between an operative position in which its said portion is engageable with said abutment means and an inoperative position in which its said portion is clear of said abutment means so that the rear panel can be drawn upwardly out of said grooves.

4,697,856

PORTABLE CABINET FOR DISPENSING MEDICATION

Aleyamma Abraham, 277 Washington St., Carteret, N.J. 07008

Filed Apr. 30, 1984, Ser. No. 605,151
Int. Cl.[4] A47B *49/00*
U.S. Cl. 312—305 **3 Claims**



1. A portable cabinet for dispensing medication to patients comprising:

a plurality of vertically arranged and spaced-apart trays disposed within said cabinet, with each of the trays being circular in shape and used at a different interval during the day;

each of said trays including a plurality of compartments formed by divider means disposed within each of said trays; said compartments for receiving medication for said patients;

a vertically arranged stationary column formed within the

center of said cabinet, the interior of said column forming a storage compartment, said cabinet including an opening for access to said storage compartment;

a plurality of vertically arranged rods for individually rotatably mounting said trays relative to said stationary column so that each of said trays is capable of independent rotational movement relative to said column and cabinet, each of said rods including support means thereon for supporting said trays relative to said cabinet;

said support means including spacer elements disposed on said rods, said spacer elements including disks at either end thereof to rotatably engage said trays and to space said trays apart for rotational movement relative to said rods and said cabinet;

said cabinet having a plurality of vertically arranged access openings for access to each of said trays;

indicia means associated with each of said compartments for indicating a particular patient; and

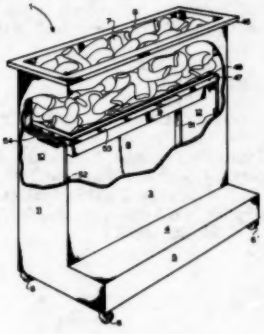
each of said cabinet openings being in alignment with one of said trays to provide access through said cabinet opening to one of said trays to rotate said tray to a selected compartment determined by said indicia means for obtaining one or more medications from the selected compartment associated with a particular patient.

4,697,857

FEEDER BIN

Dulin L. Annas, Sr., Hickory, and Richard M. Teague, Taylorsville, both of N.C., assignors to Anteg, Inc., Hickory, N.C.

Filed Dec. 12, 1986, Ser. No. 941,100
Int. Cl.[4] A47B 57/06
U.S. Cl. 312—306 **9 Claims**



1. A feeder bin having spaced-apart opposing sidewalls delimiting a cavity in which there is disposed:

(a) a first guide attached to one side wall delimiting a first guide space and a second guide attached to an opposing sidewall delimiting a second guide space;

(b) first and second elongated flexible members each having first and second terminal portions, a portion of said first flexible member disposed in said first guide space and a portion of said second elongated member disposed in said second guide space;

(c) a driving means for rotating a continuous loop, a continuous loop connected to the driving means, said continuous loop having upper and lower portions, said upper portion of the continuous loop affixed to said first terminal portion of said first elongated member and said lower portion of the continuous loop affixed to said first first terminal portion of said second flexible member; and,

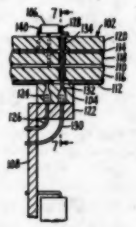
(d) a transverse member attached to the second terminal portions of said first and second flexible members.

4,697,858

ACTIVE BUS BACKPLANE

Ramanatha V. Balakrishnan, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 7, 1986, Ser. No. 827,296
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—61 **12 Claims**



1. A backplane for electrically interconnecting a plurality of daughter circuit boards, wherein each of the daughter circuit boards includes one or more signal pins for transmitting and receiving electrical signals to and form said backplane, said backplane comprising:

a backplane circuit board containing one or more signal bus lines each operable for conducting electrical signals;

a plurality of connectors each physically mounted upon and electrically coupled to said backplane circuit board and each operable for receiving one of the daughter circuit boards, wherein each connector includes one or more contact pins that electrically contact respective signal pins of a daughter circuit board inserted into said connector; and

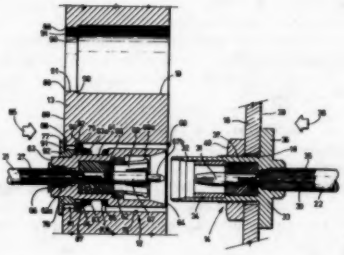
a plurality of transceivers each physically mounted upon said backplane circuit board and each electrically connected between one of said contact pins and one of said signal bus lines, wherein each transceiver is operable for electrically isolating and for relaying electrical signals between said one contact pin and said one signal bus line.

4,697,859

FLOATING COAXIAL CONNECTOR

Robert L. Fisher, Jr., Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 15, 1986, Ser. No. 897,185
Int. Cl.[4] H01R 13/434, 13/64
U.S. Cl. 439—246 **10 Claims**



6. A coaxial electrical connector adapted to be inserted into and retained in an aperture in a panel comprising:

a connector body, said connector body including at least one outer contact:

a center contact;

means for mounting said connector body to said panel, said mounting means including:

means for defining a first peripheral flange extending outwardly from said connector body;

a split retention ring loosely surrounding said connector body and defining a second peripheral flange extending outwardly from said connector body, said first flange and said split retention ring defining an annular groove therebetween for receipt of said panel to retain said connector on said panel, said retention ring being compressible inwardly relative to said connector body for permitting insertion of said connector body into said aperture, and thereafter expanding outwardly upon insertion of said connector body into said aperture for retaining said panel within said annular groove for preventing the withdrawal of said connector from said panel; and

a coil spring surrounding said connector body and having one end biased against said connector body and the opposite end biased against said retention ring for resiliently supporting said connector body for movement axially and radially relative to said panel for automatically aligning said connector body with a complimentary connector during mating of said connector body with said complimentary connector.

4,697,860

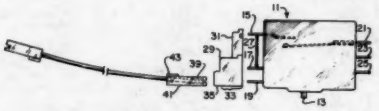
INSULATOR SYSTEM FOR SWITCH TERMINALS

Eugene F. Hildebrandt, Ferguson, and Thomas V. Ottersbach, Normandy, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Jan. 29, 1986, Ser. No. 823,619

Int. Cl.[4] H01R *13/64, 13/70*

U.S. Cl. 439—374 **7 Claims**



1. An insulator system for a plurality of male switch terminals protruding from a switch housing comprising an integrally formed insulative jacket having a skirt extending from the switch housing outwardly past the distal end of the male terminals to a relatively closed jacket top, said jacket being separate from the switch housing, the jacket further having means internal of the skirt for frictionally engaging at least one of the male terminals, the jacket top defining an opening adjacent the distal end of at least one of the male terminals so that a female terminal may be connected through the opening in the jacket top to the male terminal, the female terminal having a surrounding insulative sleeve engageable by the insulative jacket top when the male and female terminals are connected, which sleeve, in cooperation with the frictionally engaging means, holds the insulative jacket in place on the switch housing.

4,697,861

GROMMET FOR CONNECTORS

Brian Mitchell, Canterbury, England, assignor to Amphenol Corporation, Wallingford, Conn.

Continuation of Ser. No. 701,469, Feb. 14, 1985. This application Jul. 22, 1986, Ser. No. 886,943

Claims priority, application United Kingdom, Feb. 16, 1984, 8404107

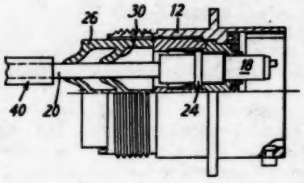
Int. Cl.[4] H10R *4/00*

U.S. Cl. 439—271 **5 Claims**

1. In a connector for electrical or optical fibre cables, said cables having a terminating member at one end thereof, and a grommet mounted in said connector and adapted to seal said cable after said terminating member is inserted therethrough, the improvement comprising:

said grommet comprising a body having a cylindrical inner wall and at least one annular sealing web of resilient material extending radially inwardly from said inner wall and having a substantially conical configuration normally facing in one axial direction, said web having a central bore defined by a cylindrical substantially flat surface coaxial with the inner wall and being defined by two substantially flat surfaces each extending from said wall at a different angle than the other and terminating at said substantially flat sealing surface and surrounding said bore,

the thickness of said web measured axially of said bore and radially inwardly from the inner wall being greater adjacent to the cylindrical sealing surface than the thickness of



said web adjacent to said inner wall due to said flat surfaces extending at said different angles so that said web is deformable axially adjacent to said inner wall to permit the passage of a terminating member of relatively large cross-section through said bore in a first axial direction and in a second, opposite axial direction and inversion of the cone if the web is pulled from one of said first or second axial directions to the other of said first or second axial directions, and

said cylindrical sealing surface being adapted to coaxially expand radially outwardly and sealingly engage 360° of an axial portion of a cable of relatively small or large cross-sectional diameter.

4,697,862

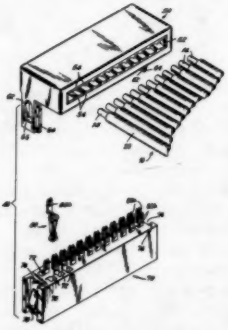
INSULATION DISPLACEMENT COAXIAL CABLE TERMINATION AND METHOD

Alexander W. Hasircoglu, Lancaster, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 739,031, May 29, 1985, Pat. No. 4,632,486. This application May 9, 1986, Ser. No. 861,259

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—404 **13 Claims**



1. A cable termination for mechanical and electrical attachment to the end of a cable assembly including (1) a plurality of co-planar, parallel, laterally spaced signal wires, each signal wire being enclosed in a first insulating sheath and having (a) an associated parallel ground wire in the plane of the signal

wires outside the first insulating sheath and (b) a conductive sheath surrounding the ground wire and the first insulating sheath, and (2) a second insulating sheath surrounding all of the conductive sheaths to thereby define a plurality of parallel coaxial cables, the ends of the conductive sheaths being recessed from the ends of the signal wires, the termination comprising:

a first housing member having an aperture for receiving the end of the cable assembly, said aperture be sized and shaped to guide each of the coaxial cables into a predetermined position in said first housing member;

means for securing the cable assembly to the first housing member;

a second housing member having a plurality of parallel, laterally spaced insulation displacement contacts extending from the second housing member in two parallel rows, the insulation displacement contacts in one row being signal wire contacts for respectively electrically contacting the signal wires, and the insulation displacement contacts in the other row being ground wire contacts for respectively electrically contacting the ground wires, the second housing member being connectable to the first housing member along a termination axis transverse to the plane of the signal wires and parallel to the insulation displacement contacts so that each signal wire contact displaces the insulation surrounding a respective one of the signal wires beyond the recessed end of the associated conductive sheath and makes electrical contact with that signal wire, and so that each ground wire contact displaces the insulation and conductive sheath surrounding a respective one of the ground wires and makes electrical contact with that ground wire; and

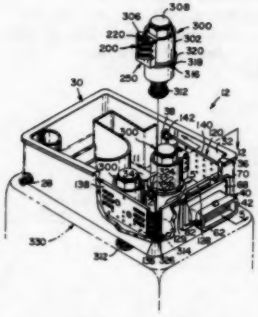
means for holding the first and second housing members together.

4,697,863

ELECTRICAL CONNECTOR ASSEMBLY FOR ANTISKID BRAKING SYSTEM

Michael D. Galloway, Middletown; William H. Rose, and David T. Shaffer, both of Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 22, 1985, Ser. No. 789,999
Int. Cl.[4] H01R *13/73*
U.S. Cl. 439—544 **11 Claims**



1. A connector assembly for receiving electrical input from a source outside a container and distribute said electrical input to a plurality of electrical articles within said container, comprising:

a bulkhead connector including a housing means mounted on a sidewall of said container and extending through an aperture thereof such that an outer mating face is matable outside said container with a mating electrical connector, and further including a plurality of contact members extending from said outer mating face to an inner mating face within said container;

a plurality of electrical articles secured within said container at selected locations proximate said sidewalls of said container, said electrical articles including respective housing means and contact members by which to receive electrical input from an outside source and respond thereto within said container; and

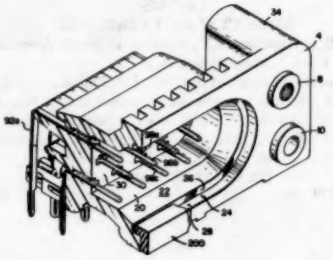
a connector harness mounted within said container and extending along sidewall portions thereof from proximate said bulkhead connector to proximate each of said electrical articles, said connector harness including essentially planar conductive path members having first contact sections in electrical engagement with said plurality of bulkhead contact members and having second contact sections in electrical engagement with said contact members of said plurality of electrical articles, said connector harness further including insulative cover means over portions of said path members and securing them therewithin such that said first contact sections are exposed outwardly to be engaged by respective spring contact arms of said bulkhead contact members, and said second contact sections are exposed inwardly to be engaged by respective spring contact arms of said conact members of said electrical articles.

4,697,864

PRINTED CIRCUIT BOARD RECEPTACLE FOR SEALED CONNECTOR

Earl J. Hayes, Advance; Ralph M. Cooper, Clemmons, both of N.C.; Keith R. Denlinger, Lancaster, and John R. Shuey, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 19, 1986, Ser. No. 876,970
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—444 **7 Claims**



1. An electrical connector for right-angled mounting on printed circuit board, comprising:

a connector body portion having a central wall, said wall having a contact receiving face and a back face, an upper mandrel extending outwardly from an upper portion of the back face, and a contact locating wall extending outwardly from a lower portion of the back face, said contact locating wall having laterally spaced apart contact locating slots therein, the slots extending from a distal end of the contact locating wall to the back face of the central wall, a lower row of apertures extending normally into the contact-receiving face and through to the back face of the central wall, said apertures being in substantial lateral alignment with the contact locating slots, an upper row of apertures extending normally into the contact-receiving face and through to the back face of the central wall, said apertures being contiguous with said mandrel and in substantial lateral alignment with said lower row of apertures;

a first row of contact terminals disposed in the lower row of apertures having first portions lying in the apertures and

second portions bent downwardly, the second portions of the contact terminals disposed in the contact locating slots;

a second row of contact terminals disposed in the upper row of apertures, having first portions lying substantially flushly along said mandrel and second portions bent downwardly and disposed in the contact locating slots characterized in that:

said contact locating slots comprise two pairs of parallel and opposed sidewalls, said first pair of sidewalls located adjacent the back face of the central wall, having means for locating the first row of contact terminals;

said second pair of sidewalls located adjacent the distal tip of said contact locating wall having a lateral spacing greater than the lateral spacing of said first pair of sidewalls, and having means to located said second row of contact terminals;

said first row of contact terminals comprising stamped and formed contacts having a pin section, an intermediate shank portion and an end section narrower than said shank portion for insertion into the printed circuit board, said terminals being so dimensioned that the end section is located between the first pair of parallel sidewalls;

said second row of contact terminals comprising stamped and formed contacts having a pin section, an intermediate shank portion and an end section narrower than said shank portion for insertion into the printed circuit board, said terminals being so dimensioned that the shank portion is located between the second pair of parallel sidewalls.

4,697,865

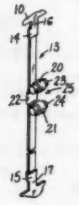
EDGE CLIP AND TERMINAL

Jack Seidler, Flushing, N.Y., assignor to North American Specialties Corp., College Point, N.Y.

Continuation-in-part of Ser. No. 569,800, Jan. 11, 1984, abandoned, which is a continuation-in-part of Ser. No. 336,630, Jan. 4, 1982, abandoned, which is a continuation-in-part of Ser. No. 230,907, Feb. 2, 1981, Pat. No. 4,367,910. This application Jul. 1, 1985, Ser. No. 750,854

Int. Cl.[4] H01R *4/02, 13/11*

U.S. Cl. 439—861 **3 Claims**



1. A terminal for securement to a contact pad on a substrate, comprising

a substantially flat elongated body portion,

a finger portion integral with and substantially parallel to said body portion and joined thereto by a fold portion,

said finger portion having a section placed substantially flat against said body portion,

said finger portion having another section bent out of the plane of the body portion to define a contact portion adapted for engagement with said contact pad.

4,697,866

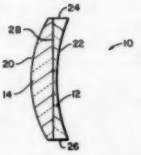
APPARATUS AND METHOD FOR FABRICATING A SANDWICH LENS

James W. Howard, Natick, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 15, 1984, Ser. No. 660,775

Int. Cl.[4] G02B *1/10*

U.S. Cl. 350—1.4 **13 Claims**



1. A method for fabricating a composite lens comprising a first optical material and a second optical material, such lens having a desired shape and optical properties, said method comprising the steps of:

A. providing a lens blank made from said first material, said blank having a planar inner surface and an outer surface;

B. vapor depositing a thick layer of said second material on said planar inner surface of said blank, said layer having a planar inner surface substantially coincident with said planar inner surface of said blank thereby forming a coplanar contact area having a desired geometry, and said layer having an outer surface opposite said inner surface of said layer; and

C. shaping said outer surface of said blank and said outer surface of said layer to provide said desired shape and optical properties.

4,697,867

MULTI-DIRECTIONAL NON-IMAGING RADIATIONS CONCENTRATOR AND/OR DECONCENTRATOR DEVICE

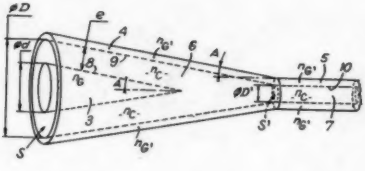
Michel Blanc, 111, Bd Longchamp, 13001 Marseille; Jean Pollard, 27, rue du Parc á Foulons, 91120 Villebon sur Yvette; Gérard Marchand, Villa 57 les Bougainvillées Avenue Rampal, 13012 Marseille, and René Henri, 7, Allée Pasteur, 13830 Rocquefort-la-Bedoule, all of France

Filed Jul. 1, 1985, Ser. No. 750,863

Claims priority, application France, Jun. 29, 1984, 84 10386

Int. Cl.[4] G02B *6/00*

U.S. Cl. 350—96.10 **11 Claims**



1. A multidirectional non-imaging device for optimizing concentration and/or deconcentration of radiations and for use as an extension of a radiation conductor of constant cross-section, comprsing:

a first means for forming a first radiation confining tapered surface having a truncated shape and being disposed with its narrow end adjacent an end of said radiation conductor and having directrices of any closed type and having generatrices of any form consistent with said tapered surface;

a second means forming at least one second radiation confin-

ing tapered surface inscribed within said first surface means; and

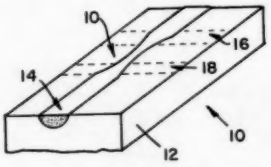
a radiation transparent medium between said first and second surface means, with the spacing between said first and second surface means being substantially constant to enable radiations confined therebetween to propagate toward and/or away from the widened end of the device.

4,697,868

INTEGRATED OPTICAL WAVEGUIDE POLARIZER

Suwat Thanivavarn, Pasadena, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Aug. 12, 1985, Ser. No. 764,693
Int. Cl.[4] G02B 6/10
U.S. Cl. 350—96.12 6 Claims



1. An integrated optical waveguide polarizer, comprising:

a generally planar substrate; and

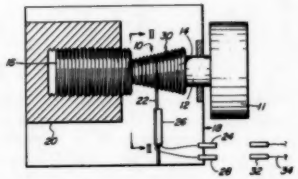
an optical waveguide strip formed in the substrate, and having a polarizer section that attenuates transmission of one polarization state without the use of claddings or other additional layers, the polarizer section having a waveguide strip of reduced width selected to inhibit operation in one polarization state but to transmit in the other polarization state with only minimal losses.

4,697,869

ATTENUATOR FOR OPTICAL FIBER

Vincent C. So; Richard P. Hughes, and Paul J. Vella, all of Edmonton, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 11, 1985, Ser. No. 786,426
Int. Cl.[4] G02B 6/26, 6/42
U.S. Cl. 350—96.15 11 Claims



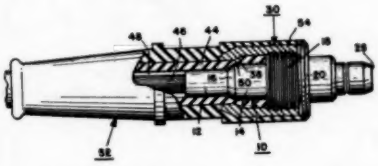
1. A variable optical attenuator comprising a curved body having different radii of curvature at different positions on the body, bending means for bending an optical fiber around the body to induce radiation loss therefrom and adjustment means for controllably altering the position of the fiber on the body to alter the fiber radius of curvature at the bend to vary optical attenuation in the fiber.

4,697,870

TERMINATION FOR LIGHT-CONDUCTING CABLE

John R. Richards, Dresher, Pa., assignor to Pilling Co., Fort Washington, Pa.

Filed Jan. 25, 1983, Ser. No. 460,762
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 9 Claims



1. In a light-conducting cable assembly comprising an elongated flexible, tubular elastomeric sheath having a light-conducting medium extending longitudinally through said sheath and surrounded thereby, an end termination at one end of the sheath comprising:

a fitting having a first section extending into the sheath at one end thereof, an exteriorly threaded second section adjacent to said first section but located beyond said one end of the sheath, and an internal passage receiving the light-conducting medium whereby the light-conducting medium extends at least part way into the internal passage and said first section of the fitting is located between the light-conducting medium and the sheath;

a ferrule having internal threads engaged with said exteriorly threaded second section and means operatively associated with the ferrule for clamping the sheath against the first section when said ferrule is rotated in one direction on said threaded second section; and

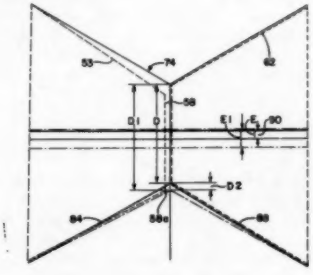
an elastomeric sleeve bonded to the exterior of said ferrule and extending therefrom over a part of said sheath toward the opposite end of the sheath.

4,697,871

TERMINATION OF OPTICAL FIBERS

John S. Cook, Rumson, N.J., assignor to Dorran Photonics Incorporated, Atlantic Highlands, N.J.

Filed May 28, 1985, Ser. No. 737,779
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.21 34 Claims



25. An optical fiber connector comprising a housing having an axially extending passage with a first exterior opening of first diameter, a second interior opening of second diameter less than said first diameter and a third exterior opening of said first diameter, and a pair of frustro-conical walls bounding said passage and extending respectively from said first opening to said second opening and from said third opening to said second

opening, and a pair of plugs, each plug having an end of said second diameter and a frustro-conical surface extending from said plug end to an intermediate location in said plug of said first diameter, each said plug containing therein an optical fiber with a fiber end face registered centrally with said plug end, each said wall having diverse radially and axially successive extents adjacent said second opening and thereby having selective radial expansibility for facilitating seating of said plugs.

4,697,872

APPARATUS FOR MUTUALLY ALIGNING THE ENDS OF TWO OPTICAL FIBRES THAT ARE TO BE CONNECTED

Hans R. Serrander, Bondegatan, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

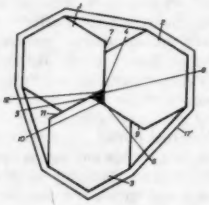
PCT No. PCT/SE83/00207, § 371 Date Dec. 29, 1983, § 102(e) Date Dec. 29, 1983, PCT Pub. No. WO83/04318, PCT Pub. Date Dec. 8, 1983

PCT Filed May 25, 1983, Ser. No. 574,094

Claims priority, application Sweden, May 27, 1982, 8203303

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **5 Claims**



1. Apparatus for mutually aligning ends of two optical fibers which are to be connected, comprising at least three rods, arranged parallel in a bundle to form between themselves a channel for accommodating the ends of the two fibers, means for maintaining the rods together and clamping the fiber ends in the channel between the rods, each rod having a polygonal cross-section and at least two plane surfaces intersecting along a longitudinal sharp edge, said rods being assembled such that opposing pairs of said plane surfaces bear flat against one another and are mutually displaced so that a portion of the flat plane surfaces which bear against one another form bounding plane sides of said channel and said longitudinal edges extend parallel to, and are distributed around a longitudinal axis of symmetry of said channel, said rods being slidably adjustable along said plane surfaces to vary the magnitude of said mutual displacement and thereby vary the size of said channel for accommodating fibers of different diameter.

4,697,873

DEVICE FOR PROTECTING OPTICAL FIBERS FREED AT THE END OF A CABLE ELEMENT

André Bouvard, and Jean Pierre Hulin, both of Conflans Ste Honorine, France, assignors to Lignes Telegraphiques et Telephoniques, Conflans Ste Honorine, France

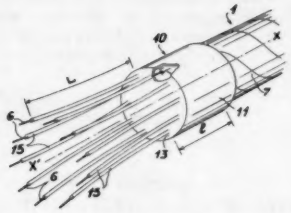
Filed Mar. 25, 1982, Ser. No. 361,822

Claims priority, application France, Apr. 3, 1981, 81 06771; May 26, 1981, 81 10453

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **16 Claims**

1. A device for protecting at least one optical fiber freed at the end of a cable element, said device comprises a sleeve adapted to be forcibly fit over the end of the cable element, said sleeve having an end face, and at least one flexible sheath in the form of a tube securely mounted to and projecting from said end face outwardly away from the sleeve, said at least one



optical fiber freed from the cable element being positioned within, and this protected by, said tube.

4,697,874

DISTRIBUTION FRAME FOR OPTICAL CABLES

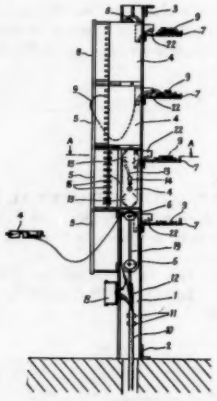
Jacques E. Nozick, 28 rue Broca, 75005 Paris, France

Filed Dec. 13, 1985, Ser. No. 808,806

Claims priority, application France, Dec. 14, 1984, 84 19201

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **10 Claims**



1. A distribution frame for optical cables (**10**) each including a plurality of cores (**12**), and each core supporting a plurality of optical fibers (**13**), said distribution frame comprising: at least one cable head comprising a vertically elongate, grooved, channel section duct (**1**) and at least one optical fiber distribution cassette (**4**) mounted on said duct, said cassette being fitted with at least two fiber connectors (**16**), a plurality of jumper fibers (**9**) for individual coupling between connectors of different cassettes, said duct including, adjacent to each cassette and inside said channel section, storage means (**6**) for storing excess length loops of cable cores, and guide means (**22**) mounted on the outside of the duct for changing the direction of jumpers disposed therein.

4,697,875

PRESSURE RESISTANT SUBMARINE OPTICAL FIBER CABLE

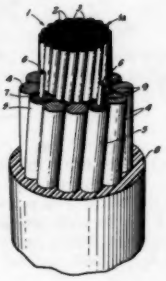
Paolo G. Priaroggia, Milan, Italy, assignor to Societa Cavi Pirelli S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 723,039, Apr. 15, 1985, and Ser. No. 723,265, Apr. 15, 1985, Pat. No. 4,676,590. This application May 16, 1986, Ser. No. 864,197

Claims priority, application Italy, May 29, 1985, 20943 A/85

Int. Cl.[4] G02B 6/44

U.S. Cl. 350—96.23 6 Claims



1. A submarine, telecommunication cable comprising:

an axially disposed and extending armor comprising a strand of wires, said armor having a size and strength sufficient to withstand tension stresses which are applied to the cable during laying and raising thereof into and out of water;

a plurality of tubes helically wound around said armor in circumferentially spaced relation to each other;

a plurality of electrical conductors helically wound around said armor with at least one electrical conductor intermediate each pair of said plurality of tubes, each said electrical conductor being a solid metallic body which is substantially incompressible under the cable operation pressures and which is substantially homogeneous in cross-section and each said tube being between and in contact with a pair of said conductors adjacent thereto so as to be supported by said pair of conductors;

a substantially incompressible fluid filling any otherwise empty spaces within said armor including any spaces between said wires;

at least one optical fiber loosely receive in each of said tubes;

a substantially incompressible fluid filling the spaces between the interior of said tubes and said optical fibers;

a layer of plastic material around said tubes and said electrical conductors, the innermost surface of said layer of plastic material contacting said tubes and said electrical conductors without filling spaces intermediate said tubes and said armor and intermediate said conductors and said armor;

a substantially incompressible fluid filling any otherwise empty spaces within said layer of plastic material including any otherwise empty spaces intermediate said tubes and said armor and intermediate said conductors and said armor; and

said cable being without armor externally of said layer of plastic material, and hence around said tubes, which, by itself, can withstand teh mechanical stresses to which the cable is subjected in use.

4,697,876

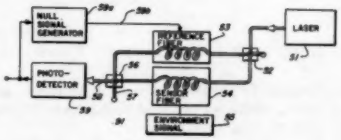
FIBER-OPTIC ROTATION SENSOR

Richard B. Dyott, Orland Park, Ill., assignor to Andrew Corporation, Orland Park, Ill.

Continuation of Ser. No. 469,977, Feb. 25, 1983, which is a continuation-in-part of Ser. No. 404,283, Aug. 2, 1982. This application Oct. 29, 1985, Ser. No. 793,711

Int. Cl.[4] G02B 6/02; G01B 9/02; H01J 5/16

U.S. Cl. 350—96.29 15 Claims



1. A fiber-optic rotation sensor comprisng a coil of a continuously drawn polarization-holding, single-mode optical fiber having a single core and cladding with different refractive indices and forming a single-mode guiding region, said fiber also having a directional coupler integral with each end portion of the coiled optical fiber,

the core of said fiber having a non-circular cross-section defining two transverse orthogonal axes, said core having a longer tansverse dimension along one of said orthogonal axes than along the other of said axes for guiding two fundamental modes, one of said modes having an electric field parallel to the axis of the longer transverse dimension and the other of said modes having an electric field parallel to the axis of the shorter transverse dimension,

the difference in the core dimensions along said orthogonal transverse axes and the difference between the refractive indices of said core and cladding being sufficiently large to de-couple the fundamental modes so that the polarization of said modes is preserved within the fiber,

said guiding region being offset from the geometric center of the fiber and located sufficiently close to one side of the surface of the fiber to allow coupling to a guided wave through said one side by exposure or expansion of the field of the guiding region, and

the outer surface of the fiber having a non-circular cross-section forming an indexing surface with a predetermined geometric relationship to said guiding region and said orthogonal transverse axes so that the location of said guiding region and the orientation of said axes can be ascertained from the geometry of said indexing surface on the exterior of the fiber,

the directional coupler integral with one end portion of the fiber having an input fiber portion excited by and splitting light from a source of coherent light,

the directional coupler integral with the other end portion of the fiber having an output fiber portion transmitting combined light from the two end portions of the coiled optical fiber, and

a photodetector receiving the combined light from said directional coupler integral with said other end portion of said fiber.

4,697,877

SURFACE-COATED OPTICAL FIBER

Yoshinori Hida; Noriyuki Meguriya, and Akira Yoshida, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 6, 1985, Ser. No. 709,036

Claims priority, application Japan, Mar. 7, 1984, 59-43531

Int. Cl.[4] G02B 6/16

U.S. Cl. 350—96.30 6 Claims

1. A surface-coated optical fiber which comprises: (a) a fibrous body made of a vitreous material; and (b) a coating layer on the surface of the fibrous body formed of a coating

composition comprising an organosiloxane-modified organic polymer having a molcular structure composed of a backbone of recurring organic units having no silicon atoms and at least one pendant group on the backbone which is an organic group containing a unit represented by the general average unit formula $R_aSiO_{4-a/2}$, in wich R is an atom or a group selected from the class consisting of a hydrogen atom, substituted or unsubstituted monovalent hydrocarbon groups, alkoxy groups and a hydroxy group and a is a number of the range from 1 to 3.

4,697,878

BI-LEVEL FOCUSING PLATE OF PHASE GRATING TYPE

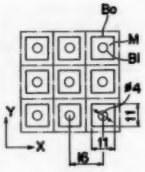
Kazuo Kimura; Tetsuyuki Tanimoto, both Sakai, and Hiroshi Kobayashi, Osaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 28, 1985, Ser. No. 706,962

Claims priority, application Japan, Mar. 1, 1984, 59-39887

Int. Cl.[4] G02B *5/18*; G03B *13/24*

U.S. Cl. 350—162.11 **20 Claims**



1. In a bi-level focusing plate of a phase grating type having a substrate with a surface on which micro unit patterns, each of which comprises one or more projections or one or more recessions defined relative to the surface of the substrate, are arranged regularly and repeatedly at a pitch of 10 to 30 μm, such that the phase difference between each of the projections and or recessions and the surface of the substrate is set at π radian against a light having a wavelength of 400 to 700 nm and such that the ratio in area of total area of the projections or recessions in one unit pattern to the area of said one unit pattern is set so as to fall into a range of 0.3 to 0.5, the improvement wherein the margins of the projections or recessions in each unit pattern comprise straight-lined portions and curved portions, and each of the unit patterns has a single projection being formed so as to have outer and inner margins respectively defined to the outer and inner portions of the surface of the substrate adjacent thereto.

4,697,879

AIRBORNE SYSTEM FOR DISPLAY OF COLLIMATED IMAGES

Jean-Pierre Gerbe, Pessac, France, assignor to Thomson CSF, Paris, France

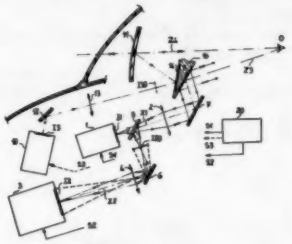
Filed Mar. 3, 1986, Ser. No. 835,340

Claims priority, application France, Mar. 1, 1985, 85 03083

Int. Cl.[4] G02B *27/10*; H04N *7/18*

U.S. Cl. 350—174 **9 Claims**

1. An airborne system for the display of collimated images comprising a first and a second head-down sighting device provided as instrument panel equipment for the purpose of displaying a first and a second image produced respectively by a first and a second high-key image generator, the first sighting device aforesaid being provided with an optical device for collimating the first image, wherein the optical collimating device also serves to collimate the second image by utilizing in the second device an optical relay objective for transferring the second image in order to form an intermediate image at a distance from an optical mixing element interposed on the optical paths between the first image and the optical collimating device and between the intermediate image and said optical collimating device so that these two images are each seen at the focus of the optical collimating device, the function of said first



generator being to produce a high-definition video frequency image and the function of said second generator being to produce a synthetic high-resolution symbol image.

4,697,880

OPTICAL SYSTEM FOR PROVIDING A COLLIMATED LIGHT BEAM

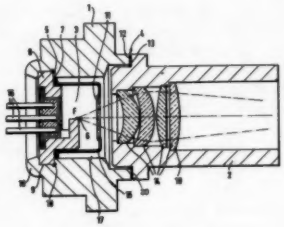
Jörg Angerstein, Flein; Dieter Mutz, and Elmar Wagner, both of Heilbronn, all of Fed. Rep. of Germany, assignors to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Apr. 8, 1985, Ser. No. 721,034

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1984, 3413748

Int. Cl.[4] G02B *7/02*

U.S. Cl. 350—247 **4 Claims**



1. An optical system for providing a collimated light beam, comprising:

an external housing including a first rotationally symmetrical holder having an axial bore, and a second rotationally symmetrical holder having an axial bore, with one end of said second holder extending partially into said axial bore of said first holder such that said second holder can be adjustably positioned axially, laterally and rotationally relative to said first holder when said holders are not connected, and being provided with an outwardly extending radial stop flange positioned adjacent, and having an outer diameter substantially equal to, the end surface of said first holder;

a semiconductor laser for producing a beam of light;

a laser housing in which said semiconductor laser is hermetically sealed, said laser housing including a bottom plate and a housing cap;

means for fixedly mounting said laser housing in one of said first and second holders so that said housing cap is disposed within the respective said axial bore and said semiconductor laser is disposed substantially on the longitudinal axis of said one of said holders, said one of said first and second holders having an average external diameter which is approximately twice the size of its internal diameter, thereby improving heat dissipation;

an optical instrument means for collimating the beam of light produced by said laser, said optical instrument means including a plurality of lenses, having a focal point, fixedly mounted within said axial bore of the other of said first and said second holders;

said first and second holders are positioned relative to one another so that said focal point of said plurality of lenses coincides with said laser; and,

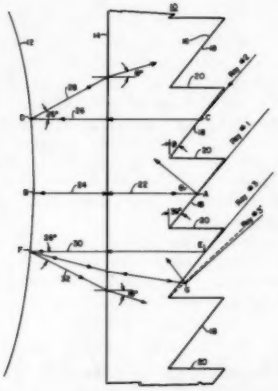
means for fixedly connecting said flange on said second holder to said end surface of said first holder to maintain said relative position of said first and second holders.

4,697,881

ANTI-GLARE FILTER

John W. Brown, New Hope, Pa., assignor to Qantix Corporation, Flemington, N.J.

Filed Apr. 23, 1985, Ser. No. 726,115
Int. Cl.[4] G02B *27/00*
U.S. Cl. 350—276 R **15 Claims**



1. A filter for reducing the glare of a viewing screen caused by ambient light, comprising: a substantially transparent sheet of material having first and second faces, said first face being substantially planar and said second face having a plurality of V-shaped grooves, each groove being formed by two walls, one of said walls being inclined at an angle of or above the critical angle of said material with respect to said first face, so that ambient light entering said second face, passing through said first face, reflecting off said viewing screen, and passing back through said first face is internally reflected.

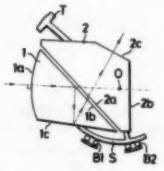
4,697,882

BEAM SPLITTER FOR CHANGING OPTICAL PATHS SMALL TILT

Yasuhisa Sato, Kanagawa; Yasuyuki Yamada, Tokyo; Hiroki Nakayama, and Kouji Oizumi, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha

Filed Sep. 5, 1985, Ser. No. 772,769
Claims priority, application Japan, Sep. 6, 1984, 59-186673
Int. Cl.[4] G02B *7/18, 23/04, 26/08*
U.S. Cl. 350—287 **8 Claims**

1. A light beam splitting device comprising a first prism having an entrance face at which a light beam enters, an inclined face for either transmitting or totally reflecting the entering light beam, and a reflecting face for reflecting the light beam after the total reflection from the inclined face, and a second prism having an entrance face confronting the inclined face of the first prism to receive the exiting light beam from the inclined face, and two exit faces from which the light beam transmitted directly through the inclined face and the light beam having been totally reflected from the inclined face selectively emerge, respectively, wherein said light beam splitting device further comprises means for rotating the first and second prisms as a unit so as to selectively transmit or totally



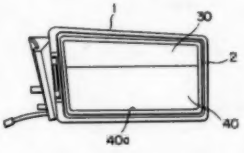
reflect the entering light beam through or from the inclined face of the first prism, respectively, causing the exiting light beam to emerge from the selected one of the two exit faces of the second prism.

4,697,883

CONTROL APPARATUS FOR TWO SECTION, GLARE SHIELD MIRROR

Yasutoshi Suzuki; Hiroshi Itoh, both of Obu; Shinya Ohmi, Anjo, and Kunihiko Hara, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 22, 1985, Ser. No. 768,150
Claims priority, application Japan, Aug. 30, 1984, 59-182275
Int. Cl.[4] G02B *17/00*; G02F *1/13*
U.S. Cl. 350—331 R **7 Claims**



1. A glare shield type reflecting mirror control apparatus of a vehicle for controlling glare shield of a reflecting mirror which has first and second electro-optic elements respectively on upper half and lower half portions of a reflecting mirror layer, the transmittance of light of said first and second electro-optic elements being varied in accordance with an applied voltage, said glare shield type reflecting mirror control apparatus comprising:

incident light detecting means for detecting light incident on said reflecting mirror from behind said vehicle;

first determining means for determining whether the incident light detected by said incident light detecting means is light corresponding to the direct sunlight or not;

second determining means for determining whether the incident light detected by said incident light detecting means is light stronger than light corresponding to light of a headlight of a following vehicle or not;

day and night determining means for determining the day or the night;

first control means, upon determination of said first determining means that the incident light is the light corresponding to the direct sunlight, for applying a voltage to at least said first electro-optic element to cause the upper half portion of said reflecting mirror to become a glare shield condition; and

second control means, upon determination by said second determination means that the incident light is the light stronger than the light corresponding to the light of the headlight of the following vehicle and upon determination by said day and night determining means that it is the

nighttime, for applying the voltage to only said second electro-optic element of said first and second electro-optic elements to cause the lower half portion of said reflecting mirror to become the glare shield condition.

4,697,884

LIQUID CRYSTAL DISPLAY HAVING DEGREE OF TWIST AND THICKNESS FOR IMPROVED MULTIPLEXING

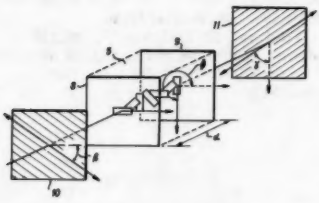
Hermann Amstutz, Mellingen; Dieter Heimgartner, Baden; Meinolph Kaufman, Baden-Rütihof, and Terry J. Scheffer, Forch, all of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Continuation of Ser. No. 626,380, Jun. 29, 1984, Pat. No. 4,634,229. This application Sep. 17, 1986, Ser. No. 908,667

Claims priority, application Switzerland, Jul. 12, 1983, 3819/83; Oct. 28, 1983, 5835/83

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—334 15 Claims



1. A multiplexible liquid crystal display comprising:

front and rear plane-parallel support plates which form a cell with inner surfaces and a border;

a nematic liquid crystal filled into the cell, said nematic liquid crystal having positive dielectric anisotropy and a chiral additive;

electrode layers formed on the inner surfaces of the support plates;

orientation layers formed on said electrode layers, which orientation layers align adjoining liquid crystal molecules in such a way that a local optical axis of the liquid crystal at said orientation layers has a tilt angle with respect to the plane-parallel support plates;

polarizer means for polarizing light at least twice between entering and leaving the display, including at least a front polarizer;

said support plates separated by a distance less than 10 μm;

said liquid crystal exhibiting a total twist angle ϕ in the cell, said total twist having an absolute value which is greater than or equal to 180° and smaller than 360°;

said liquid crystal having a layer thickness (d) and a pitch (p), wherein the ratio between layer thickness (d) and pitch (p) of the liquid crystal has an absolute value greater than or equal to 0.50 and less than or equal to 0.95;

said front polarizer having a direction of vibration which makes an angle with the orientation direction of the front orientation layer such that, because of the total twist (ϕ) and the birefrigence (Δn) of the liquid crystal, the originally linearly polarized light becomes elliptically polarized and the contrast ratio optimal;

multiplexing means for switching of the display with operating voltages outside any bistable range of the transfer characteristic; and

spacers distributed over the viewing area of the display.

4,697,885

DISPLAY DEVICE AND DECAL FOR FORMING A DISPLAY PANEL TERMINAL

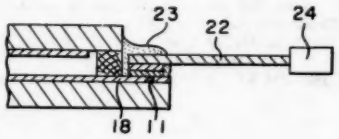
Toshio Minowa; Tetsuro Hashimoto, both of Yokohama; Kohji Kuroda, Kasugai, and Kazutaka Nakayama, Nagoya, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo and Noritake Co., Limited, Nagoya, both of, Japan

Continuation of Ser. No. 556,371, Nov. 30, 1983, abandoned. This application Aug. 19, 1986, Ser. No. 898,776

Claims priority, application Japan, Dec. 1, 1982, 57-209301; Oct. 11, 1983, 58-188428

Int. Cl.[4] G02F *1/13;* H01B *13/10;* H01R *4/00*

U.S. Cl. 350—334 7 Claims



1. A display device comprising:

a display panel having a transparent electrode terminal;

a thick film conductor bonded to said transparent electrode terminal by a transfer mounting method using a transfer decal, said thick film conductor comprising first and second layers, said first layer being bonded on said transparent electrode terminal; and

a flexible printed circuit cable having a conductor soldered onto said second layer,

the composition of said first layer being low in conductivity and including a resin and a conductive material,

the composition of said second layer being high in conductivity and including a resin and a conductive material.

4,697,886

COLOR LIQUID CRYSTAL DISPLAY DEVICE WITH INTERDIGITED SEGMENT ELECTRODES

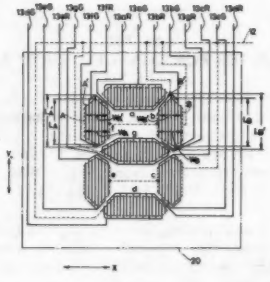
Hiroshi Ito, Katsuta; Masaru Kugo, Ibaraki, and Sizuhisa Watanate, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Ibaraki, both of, Japan

Filed Oct. 8, 1986, Ser. No. 916,698

Claims priority, application Japan, Oct. 9, 1985, 60-223627; Dec. 11, 1985, 60-276821

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—336 6 Claims



1. In a color liquid crystal display device of the type which includes a pair of transparent substrates facing each other in parallel, a pair of transparent electrodes formed on the opposed inner surface sides of said transparent substrates, color filters formed on one of said transparent electrodes in such a manner

as to face the other of said transparent electrodes and a liquid crystal interposed between said color filters and the other of said transparent electrodes, and in which a voltage is applied to the pair of said transparent electrodes and color display is effected by controlling the transmission quantity of said liquid crystal, the improvement wherein:

One of said transparent electrodes is disposed as display segments at part inside the full display range of said color liquid crystal display device occupied by said transparent electrodes;

said display segment consists of two sets of comb tooth-like electrodes which are controlled independently of each other and are disposed in such a manner that their comb portions are in engagement with one another; and

the direction of comb teeth of said comb tooth-like electrodes of all of said display segments are arranged in the same direction.

4,697,887

LIQUID CRYSTAL DEVICE AND METHOD FOR DRIVING THE SAME USING FERROELECTRIC LIQUID CRYSTAL AND FET'S

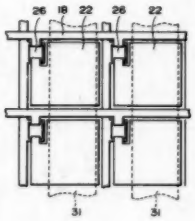
Shinjiro Okada, and Yasuyuki Tamura, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 18, 1985, Ser. No. 724,828

Claims priority, application Japan, Apr. 28, 1984, 59-85119; Jun. 11, 1984, 59-118183; Jun. 11, 1984, 59-118184; Jun. 11, 1984, 59-118185; Jun. 11, 1984, 59-118186; Jun. 11, 1984, 59-118190; Jun. 19, 1984, 59-124511; Jun. 19, 1984, 59-124512; Jun. 19, 1984, 59-124513; Jun. 19, 1984, 59-124514; Jun. 19, 1984, 59-124515; Jun. 19, 1984, 59-124516; Jun. 19, 1984, 59-124517; Jun. 19, 1984, 59-124518; Jun. 19, 1984, 59-124519; Jun. 22, 1984, 59-127415; Jun. 22, 1984, 59-127416; Jun. 22, 1984, 59-127417; Jun. 22, 1984, 59-127418; Jun. 22, 1984, 59-127419; Jun. 26, 1984, 59-129999; Jun. 26, 1984, 59-130000; Jun. 26, 1984, 59-130001

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—350 S **51 Claims**



1. A driving method for a liquid crystal device of the type comprising a plurality of FET's each having a gate and a first and a second terminal other than the gate, a first base plate having thereon a plurality of picture element electrodes each corresponding to an FET and connected to the first terminal of the FET, a second base plate having thereon counter electrodes opposite to the picture element electrodes, and a ferroelectric liquid crystal having first and second orientation states and sandwiched between the first and second base plates; said driving method comprising:

a first phase of forming an electric field between a first terminal and a second terminal of an FET to result in the first orientation state of the ferroelectric liquid crystal, and

a second phase of forming an electric field of the polarity opposite to that of the electric field applied in said first phase between a first terminal and a second terminal of an FET to result in the second orientation state of the ferroelectric liquid crystal; said first and second phases being respectively carried out in synchronism with the application of a signal for turning on the gates of the FET's respectively involved in the first and second phases.

41. A liquid crystal device comprising a plurality of FET's each having a gate and a first and a second terminal other than the gate, a first base plate having thereon a plurality of picture element electrodes each corresponding to one of said plurality of FET's and connected to the first terminal thereof, a second base plate having thereon counter electrodes opposite to the picture element electrodes and a ferroelectric liquid crystal sandwiched between the first and second base plates.

4,697,888

FREQUENCY SHIFTED CAVITY FOR ELECTROMAGNETIC RADIATION

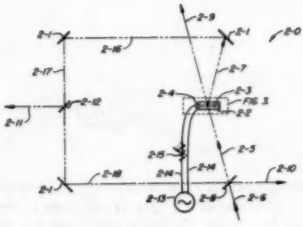
Donald C. Schmadel, Jr., Kensington, Md., and William H. Culver, Washington, D.C., assignors to Chevron Research Company, San Francisco, Calif.

Filed Apr. 21, 1982, Ser. No. 370,434

The portion of the term of this patent subsequent to Apr. 29, 2003, has been disclaimed.

Int. Cl.[4] G02F *1/11, 1/33*

U.S. Cl. 350—358 **34 Claims**



24. A method of filtering electromagnetic radiation comprising:

(a) directing a beam of electromagnetic radiation in a predetermined ring cavity configuration;

(b) shifting the frequency of a portion of said beam of electromagnetic radiation; and

(c) directing said frequency shifted portion of said beam of electromagnetic radiation along essentially the same configuration and in essentially the same direction as said beam of electromagnetic radiation so as to have essentially the same polarization as said beam of electromagnetic radiation.

4,697,889

LIGHT SHUTTER ARRAY ELEMENT

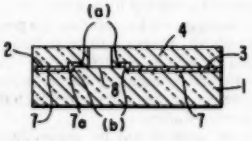
Yoneharu Takubo, Neyagawa; Yasutaka Horibe, Ibaraki, and Nobue Yamanishi, Higashiosaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 14, 1985, Ser. No. 798,029

Claims priority, application Japan, Nov. 14, 1984, 59-239808

Int. Cl.[4] G02F *1/03*

U.S. Cl. 350—392 **7 Claims**



1. A light shutter array element comprising:

a transparent ceramic substrate having on a main surface

thereof a plurality of electrodes in spaced opposed relation to each other across said main surface; and

polarizing plates on both sides of said transparent ceramic substrate having different polarizing axes from each other, said transparent ceramic substrate having a plurality of spaced grooves provided in said main surface, said plurality of electrodes being on the bottom and side wall surfaces of said grooves and on a part of said main surface in the vicinity of said grooves.

4,697,890

LIGHT EMITTING DEVICE

Byron F. Crookston, deceased, late of Provo, Utah, by JenaVee S. Crookston, administrator, 1207 North, 1650 West, Provo, Utah 84604

Filed Oct. 3, 1985, Ser. No. 783,773
Int. Cl.[4] G02B *26/02*; F16D *3/00*
U.S. Cl. 350—407 **3 Claims**

1. A pair of polarized lenses to be used in a device for emitting an incident beam of light comprising a first generally disc-shaped lens made of a linear polarized material, said first lens having a pair of elongate indentations or slots formed in the periphery thereof, said indentations or slots being positioned diametrically opposite from each other; and

a second generally disc-shaped lens made of a linear polarized material, said second lens having a pair of projections extending from the periphery of the second lens so as to extend from the plane of the second lens, said projections being adapted to be received at least one at a time in a mutually respective indentation or slot in said first lens when the first and second lenses are positioned in closely spaced, face-to-face arrangement.

4,697,891

FOCAL LENGTH VARIABLE LENS APPARATUS

Tohru Kawai, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1984, Ser. No. 646,633
Claims priority, application Japan, Sep. 2, 1983, 58-162309
Int. Cl.[4] G02B *7/11, 15/14*
U.S. Cl. 350—429 **12 Claims**

1. A focal length variable optical apparatus, comprising:

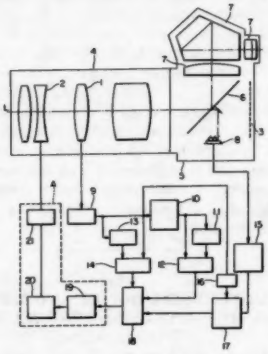
(a) a first optical system for changing the focal length by shifting its position;

(b) a second optical system for compensating deviation in an image forming position caused by the shifting of the first optical system by shifting its position;

(c) first computing means for computing a position to which the second optical system is to be shifted on the basis of the position to which the first optical system has been shifted, said first computing means including encoder means for detecting the position to which the first optical system has been shifted;

(d) second computing means for computing a position to which the second optical system is to be shifted to perform the compensation by optically detecting the deviation of the image forming position; and

(e) control means for actuating the second optical system on the basis of the computation result of the first computing means and the computation result of the second computing means, said control means shifting the position of said



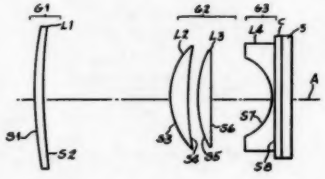
second optical system on the basis of the computation result of the first computing means and then shifting the position of the second optical system on the basis of the computation result of the second computing means.

4,697,892

PROJECTION LENS

Ellis I. Betensky, New York, N.Y., assignor to U.S. Precision Lens, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 543,017, Oct. 18, 1983, abandoned. This application Aug. 21, 1984, Ser. No. 642,825
Int. Cl.[4] G02B *13/18, 9/34*
U.S. Cl. 350—432 **57 Claims**



1. A projection lens from the image end consisting of a first lens unit of weak optical power serving to provide correction for aperture dependent aberrations, said first lens unit comprising a single element, a second lens unit having convex image and object surfaces and providing substantially all of the positive power of the overall lens, and a third negative lens unit air spaced from said second lens unit having a strongly concave image side surface and contributing to correction of field curvature; said second lens unit consisting of two elements having facing surfaces defining a meniscus shaped air gap, one of said elements of said second lens unit being biconvex, said first, second, and third groups having optical powers K_{G1}, K_{G2}, and K_{G3}, respectively, the overall lens having an optical power K_0, and

$$0.3 > G_{G1}/K_0 > -0.05$$

$$1.4 > K_{G2}/K_0 > 0.8$$

$$1.4 > |K_{G3}/K_0| > 0.70$$

4,697,893
MICROSCOPE WITH A BINOCULAR TUBE

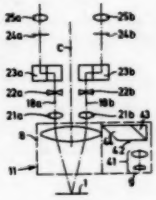
Erwin Fehr, Heerbrug, and Andreas Schaefer, Balgach, both of Switzerland, assignors to Wild Heerbrugg AG, Heerbrugg, Switzerland

Filed Jun. 27, 1985, Ser. No. 749,273

Claims priority, application Switzerland, Jun. 29, 1984, 3157/84

Int. Cl.[4] G02B *21/22, 21/00*

U.S. Cl. 350—516 **13 Claims**



1. A microscope comprising:

a binocular tube;

an optical support coupled to said binocular tube;

a microscope twin optical system with first and second subsystems mounted in said optical support, said first system having a first optical axis, said second subsystem having a second optical axis;

an objective changer coupled to said optical support for relative movement between first and second positions

first and second objectives mounted on said changer for movement relative to said optical support between operative and inoperative positions, said first objective providing stereoscopic observation, said second objective providing monocular observation and having an optical axis coinciding with the second optical axis only when in the operative position thereof; and

object supporting means disposed in fixed position below the changer and objectives;

whereby each of the objectives can be individually and selectively connected upstream of said twin optical system by movement of said changer between said first and second positions without shifting the position of the object supporting means or countershifting the tube, support or optical system.

4,697,894
CONNECTION DEVICE FOR CONNECTING AN ASSOCIATED UNIT TO AN EYEPIECE SECTION OF AN ENDOSCOPE

Koji Takamura; Takamasa Hosoya, and Kazunari Kobayashi, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 27, 1985, Ser. No. 802,250

Claims priority, application Japan, Nov. 30, 1984, 59-233078; Nov. 30, 1984, 59-182018

Int. Cl.[4] G02B *7/00*

U.S. Cl. 350—574 **11 Claims**

1. A connection device for connecting an associated unit to an eyepiece section of an endoscope, comprising:

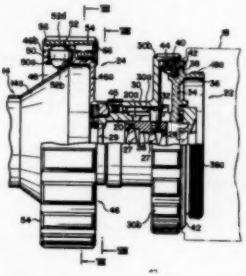
a connecting section detachably connected to the eyepiece section of the endoscope;

said connecting section including;

a main body having a fitting recess with a circular inner surface in which said eyepiece section is fitted, and a plurality of support holes each of which opens into the inner surface of the recess and extends in the radial direction of the recess;

a plurality of locking bodies for holding the eyepiece section fitted to the recess, each of said locking bodies having a cylindrical slide portion which has a diameter slightly smaller than that of the corresponding support hole and is slidable in the corresponding support hole along the axial direction of the support hole, and a pressing portion projected into the recess from that end surface of the slide portion which is located at the recess side, through movement of the slide portion, to abut against an outer surface of said eyepiece section;

means for preventing the slide portions from slipping out of the respective support hole, said means having projections, each extending inward from the open end edge of the corresponding support hole on the recess side and capable of abutting against said end surface of the slide portion; and



a clamp member supported on the main body external of the locking bodies and movable between a press position where it pushes the locking bodies into the recess and an open position wherein the locking bodies are released from their pushed state.

4,697,895
AUTOMATIC OPTOMETER

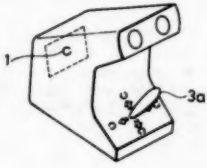
Kyoji Sekiguchi, Tokyo, and Yoshimi Kobayakawa, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1985, Ser. No. 741,274

Claims priority, application Japan, Jun. 12, 1984, 59-120137

Int. Cl.[4] A61B *3/02*

U.S. Cl. 351—243 **9 Claims**



1. An automatic optometer comprising:

a first visual target for measuring the visual acuity of a subject;

a response input unit for the subject to input a response corresponding to said visual target;

a control unit for determining the accuracy of the subject's response input relative to said visual target, and for presenting additional different visual targets;

a counter, said counter being reset each time a visual target is presented;

a comparison unit for comparing the output of said counter with a predetermined value; and

request means for requesting the subject's response input

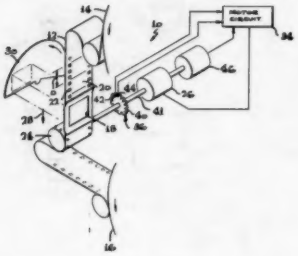
prior to the termination of a predetermined response period, said request means being responsive to an output of said comparison unit.

4,697,896

ELECTRONIC PROJECTOR

Charles Fox, Thousand Oaks, Calif., assignor to Showscan Film Corporation, Culver City, Calif.

Filed Sep. 30, 1986, Ser. No. 913,680
Int. Cl.[4] G03B *21/48*
U.S. Cl. 352—180 **16 Claims**



1. In a projector having a sprocket wheel which cyclically pulls a film having film frames spaced by a predetermined frame-spacing distance in a forward direction through a film gate, an electrically energized motor which cyclically drives said sprocket wheel, and a motor-energizing circuit which applies a plurality of high voltages to rapidly accelerate said sprocket wheel then rapidly decelerate said sprocket wheel, and which then applies a fine adjustment to sprocket wheel position during each cycle to accurately position a film frame at the film gate at the end of the cycle, the improvement wherein:

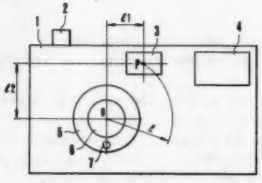
said motor-energizing circuit includes means for sensing the position of said sprocket wheel at a time in each cycle after a majority of wheel movement in the cycle has occurred, and for adjusting the application of at least one of said high voltages during a subsequent cycle to urge the sprocket wheel to reach a predetermined position at a predetermined time during the subsequent cycle.

4,697,897

WATERTIGHT CAMERA

Hideo Tamamura, Tokyo, Japan, assignor to Canon Kabushiki Kaisha

Continuation of Ser. No. 644,536, Aug. 27, 1984, abandoned. This application May 6, 1986, Ser. No. 861,109
Claims priority, application Japan, Aug. 30, 1983, 58-133960[U]; Sep. 14, 1983, 58-170008
Int. Cl.[4] G03B *17/08, 15/03, 13/14*
U.S. Cl. 354—64 **7 Claims**



1. A watertight camera comprising:

(a) a photographic lens; and

(b) a finder having an objective protection transparent plate, said objective protection transparent plate being inclined with the normal line thereof to the axial direction of said photographic lens, wherein the angle of inclination α of the transparent plate satisfies the following formula:

$$\tan\alpha = \frac{\sin\theta}{\cos\theta - \frac{n1}{n3}}$$

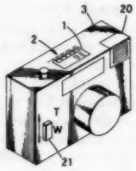
where n1 is the refractive index of air; n3 is the refractive index of water, and θ is the angle whose tangent equals l/L, wherein l is the distance from the center of said photographic lens to the center of said transparent plate, and L is the distance from the film plane to an object to be photographed.

4,697,898

DISPLAY DEVICE OF A CAMERA SYSTEM

Hiroshi Wakabayashi, Yokohama; Kazuyuki Kazami, and Isao Uchida, both of Tokyo, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Oct. 25, 1985, Ser. No. 791,450
Claims priority, application Japan, Oct. 31, 1984, 59-228015
Int. Cl.[4] G03B *15/01, 17/18*
U.S. Cl. 354—127.13 **18 Claims**



1. A camera having a photo-taking lens whose focal length is changeable, said camera including:

(a) means responsive to said photo-taking lens for producing a detection signal according to the focal length of said photo-taking lens;

(b) flash means for emitting flash light;

(c) display means; and

(d) control means responsive to said detection signal to cause said display means to display the distance to objects which can be photographed when said flash means emits the flash light.

4,697,899

MOTORIZED DRIVE DEVICE FOR CAMERA

Masaharu Kawamura, Kawasaki; Yoshihito Harada, Yokohama; Ryuichi Kobayashi, Kawasaki; Masayuki Suzuki, Yokohama; Tsunemasa Ohara, and Yoichi Tosaka, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 29, 1986, Ser. No. 913,137
Claims priority, application Japan, Oct. 3, 1985, 60-219121; Oct. 3, 1985, 60-219122; Oct. 16, 1985, 60-228944
Int. Cl.[4] G03B *1/12*
U.S. Cl. 354—173.11 **12 Claims**

1. A motorized drive device for a camera comprising:

(a) a motor as a rotation drive source;

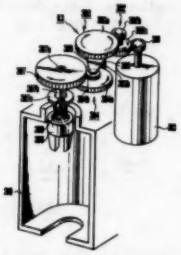
(b) a transmission system to be driven by said motor;

(c) a camera mechanism to be driven by the output of said transmission system;

(d) control means for controlling the rotation of said motor by current supply, said control means controlling the current supply in such a manner that said motor rotates at least at a first speed and a second speed which is slower than said first speed; and

(e) low speed abnormal detecting means for detecting a state that the speed of rotation of said motor is slower than a

prescribed reference speed, said detecting means having set therein a first reference speed when the current supply is controlled to said first speed of rotation, and a second



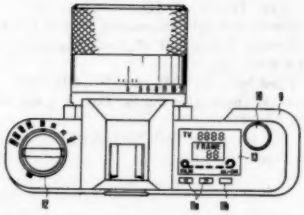
reference speed when the current supply is controlled to said second speed of rotation, and said first reference speed being made faster than said second reference speed.

4,697,900

DISPLAY DEVICE FOR A CAMERA

Masaharu Eguchi, Tokyo, and Masayoshi Kiuchi, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 668,742, Nov. 6, 1984, abandoned. This application Jul. 18, 1986, Ser. No. 888,268
Claims priority, application Japan, Nov. 9, 1983, 58-210631
Int. Cl.[4] G03B *1/00*
U.S. Cl. 354—215 **11 Claims**



1. A camera having a display device, comprising:

(a) film transport detecting means for detecting whether a film is being transported or not being transported and for forming a transport signal when the film is transported;

(b) a display device having a plurality of display elements for indicating a plurality of display states;

(c) a control circuit responsive to said transport signal for activating said display elements successively in a prescribed order, said circuit effecting the display states of the plurality of display elements when the film transport stops upon completion of advancement of one frame;

(d) a timer circuit for producing an output when the transportation of film corresponding to one frame is not completed within a timer period; and

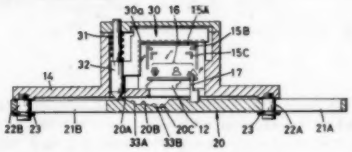
(e) said control circuit being responsive to said output for moving the display state of said display elements to a different display state from that effected in response to said transport signal.

4,697,901

PARALLAX CORRECTING DEVICE IN THE FINDER OF A CAMERA

Hiroshi Wakabayashi, Yokohama, and Koichi Wakamiya, Tokyo, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Jan. 17, 1986, Ser. No. 819,609
Claims priority, application Japan, Jan. 30, 1985, 60-15794
Int. Cl.[4] G03B *13/14, 13/10*
U.S. Cl. 354—221 **10 Claims**



8. A camera comprising:

a photo-taking lens system having an optic axis and movable along said optic axis for focusing;

viewfinder means including an objective having an optic axis different from the optic axis of said photo-taking lens system, first view field indicating means provided to indicate the range of a photographing picture plane obtained when an object to be photographed lying in a predetermined distance range is photographed within an observation view field formed through said objective, and second view field indicating means provided to indicate the range of a photographing picture plane obtained when an object to be photographed lying outside said predetermined distance range is photographed within said observation view field;

zone mark indicating means for indicating a plurality of characters representing distance zones of the object to be photographed within said observation view field;

a moving member having a pointer for selectively indicating said characters and displaced in response to movement of said photo-taking lens system so as to move said pointer along said characters;

cam means including a cam surface provided on said moving member and a cam follower displaced in accordance with said cam surface; and

preventing means responsive to said cam follower for preventing viewing of at least a part of said second view field indicating means when said photo-taking lens system is focused to the object to be photographed lying in said predetermined distance range.

4,697,902

DEVICE FOR CONTAINING A RADIATION RECORDING MEDIUM

Yasunori Maehara, Tochigi; Sigemi Fujiwara; Katsuhide Koyama, both of Ootawara; Kaoru Tamura, Odawara; Yasuhiro Kawai, and Kazuya Watanabe, both of Minami-ashigara, all of Japan, assignors to Kabushiki Kaisha Toshiba and Fuji Photo Film Co., Ltd., both of, Japan

Filed Feb. 19, 1986, Ser. No. 830,929
Claims priority, application Japan, Feb. 20, 1985, 60-33086; Feb. 20, 1985, 60-33087
Int. Cl.[4] G03B *17/26;* B65D *85/30*
U.S. Cl. 354—281 **19 Claims**

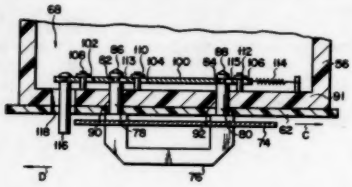
1. A device for holding a radiation image recording medium, comprising:

a casing having an opening through which the recording medium is placed therein;

a light shutting plate for closing said opening to prevent light from penetrating into said casing, said light shutting plate

being slidably insertable in and removable from said casing;

a handle fixed to said light shutting plate; and



locking means for bringing said light shutting plate into locking engagement with said casing at times when said light shutting plate closes said opening of said casing.

4,697,903

CAMERA BACK LID OPENING APPARATUS

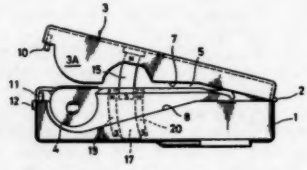
Takao Koda; Hirokazu Ichii, both of Saitama, and Hiroshi Komatuzaki, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 29, 1986, Ser. No. 912,762

Claims priority, application Japan, Sep. 27, 1985, 60-147840[U]

Int. Cl.[4] G03B *1/00, 17/02*

U.S. Cl. 354—288 **7 Claims**



1. In a camera back lid opening apparatus of the type wherein a back lid is attached to a camera body for opening and closing movement and is adapted to be opened to a predetermined position by releasing back lid latching means for allowing a film container with a leader previously withdrawn therefrom to be inserted endwise into a film supply chamber of said camera body; the improvement comprising

first means having magnetic poles in opposition to each other at its opposite ends which is disposed on said back lid;

second means having magnetic poles in opposition to each other at its opposite ends which is disposed on said camera body; and

said first and second means being so associated with each other as to produce therebetween magnetic repulsion when said back lid is in its closed position and magnetic attraction when said back lid is in said predetermined position, whereby said back lid is repelled by said repulsion to open upon releasing said back lid latching means and is held opened in said predetermined open position by said attraction.

4,697,904

AUTOMATIC FOCUSING SYSTEM

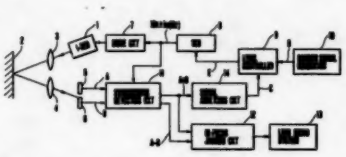
Kouji Takahashi, and Akihiro Fujiwara, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 799,442

Claims priority, application Japan, Nov. 28, 1984, 59-250871

Int. Cl.[4] G03B *3/00*

U.S. Cl. 354—403 **4 Claims**



1. An automatic focusing system comprising:

(a) means for projecting a metering radiation onto an object to be photographed;

(b) means for controlling the operation of said light emitting means so as to project the radiation in the form of pulses;

(c) means for receiving the reflection-back radiation from the object;

(d) means for judging an in-focus condition on the basis of a signal of said radiation receiving means;

(e) means for controlling the movement of a lens in accordance with a signal from said judging means; and

(f) means for changing the frequency of said radiation control means so that said pulses of radiation of said radiation projecting means occur randomly.

4,697,905

PHOTOGRAPHIC APPARATUS

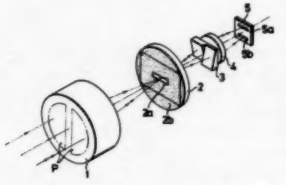
Kazuo Fujibayashi; Tokuichi Tsunekawa, both of Kanagawa, and Hiroshi Ohmura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

Filed Nov. 27, 1985, Ser. No. 802,760

Claims priority, application Japan, Dec. 3, 1984, 59-255396; Sep. 21, 1985, 60-209437

Int. Cl.[4] G03B *3/00, 7/099*

U.S. Cl. 354—406 **10 Claims**



1. A photographic apparatus comprising:

focus detecting means receptive of the light passed through a photographic lens for detecting the state of focus of the photographic lens;

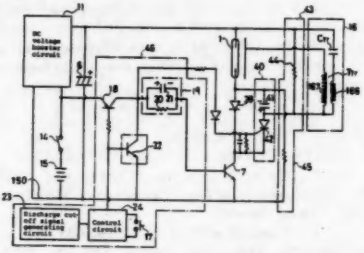
masking means arranged substantially in coincidence with a predetermined focal plane of said photographic lens to limit a focus detecting area,

whereby at least a portion of said masking means constitutes light metering means for controlling the exposure of said photographic apparatus.

4,697,906
ELECTRIC FLASH DEVICE

Takashi Kobayashi, and Yuji Maruyama, both of Saita, Japan, assignors to West Electric Company, Ltd., Osoki, Japan

Filed Sep. 26, 1986, Ser. No. 912,000
Claims priority, application Japan, Sep. 27, 1985, 60-215439; Jul. 22, 1986, 61-172086
Int. Cl.[4] H05B *41/00*; G03B *15/05*
U.S. Cl. 354—416 **11 Claims**



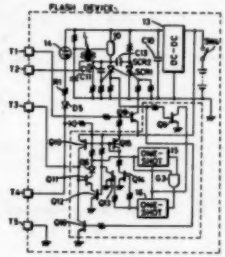
1. An electric flash device comprising:
a flash tube,
a main capacitor connected in parallel with a high voltage power source,
a first transistor connected in series with said flash tube for controlling discharge of an electric charge stored in the main capacitor,
a second transistor connected across a low voltage power source and the base of said first transistor in series with a circuit of a parallel connection of a current restriction resistor and a capacitor said second transistor being for controlling the base current thereof,
a switching means connected across the base and the emitter of said first transistor through the parallel connection of the current restriction resistor and the capacitor,
a trigger circuit for exciting said flash tube by operation of a synchronous switch,
a discharge cut-off signal generating circuit for generating a discharge cut-off signal upon detection of a predetermined accumulated amount of a light radiation, and
a control circuit for controlling turning ON of said second transistor and for remaining OFF said switching means by closure of said synchronous switch, and for turning OFF said second transistor and for turning ON said switching means by receiving said discharge cut-off signal.

4,697,907
FLASH PHOTOGRAPHING SYSTEM

Nobuhiko Terui, Tokyo, and Nobuyoshi Haginda, Kawasaki, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Continuation of Ser. No. 821,762, Jan. 23, 1986, abandoned. This application Dec. 30, 1986, Ser. No. 948,438
Claims priority, application Japan, Jan. 30, 1985, 60-15796
Int. Cl.[4] G03B *15/05*
U.S. Cl. 354—416 **15 Claims**

1. A flash device in a flash photographing system including a camera having a light output control circuit for producing a stop of light emission signal when a light intensity of an illumination light reflected by an object reaches a predetermined level and a start circuit to start activation of said light output control circuit in response to a start of light emission signal, and a flash device electrically connected to said camera and having a flash bulb for emitting the illumination light, comprising:
detection means for detecting electrical connection with said camera,
start of light emission signal generating means responsive to said detection means for supplying said start of light emission signal to said start circuit of said camera in synchronism with the emission of the illumination light by said flash bulb; and

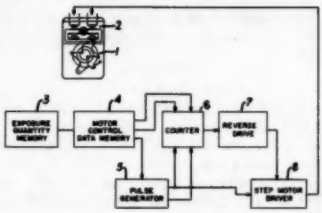


light emission stop means for stopping the emission of the illumination light by said flash bulb in response to the stop of light emission signal from said light output control circuit of said camera.

4,697,908
PROGRAM SHUTTER

Masuo Ogihara; Hajime Oda; Yoichi Seki, and Hiroshi Yamazaki, all of Yotsukaido, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1985, Ser. No. 706,505
Claims priority, application Japan, Mar. 1, 1984, 59-39083
Int. Cl.[4] G03B *7/08*
U.S. Cl. 354—439 **17 Claims**

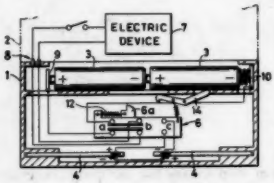


1. A program shutter comprising: a shutter mechanism including at least one sector movable in opening and closing directions to form a lens aperture, and a step motor rotatable in forward and reverse directions for opening and closing the sector; and a control unit comprising exposure quantity storage circuit means for storing exposure quantity data corresponding to the brightness of a subject being photographed, motor control data storage circuit means for storing step drive number data proportional to the exposure quantity data and interpolation quantity data corresponding to the exposure quantity data, pulse generator circuit means for generating step drive pulses, first presettable counter means presettable with the step drive number data before opening of the sector and downcounted to zero by the drive pulses, second presettable counter means presettable with the interpolation quantity data and downcounted to zero by the clock pulses commencing after the first counter means has downcounted to zero, reverse drive circuit means for detecting when the second counter means counts down to zero and thereafter effecting rotation of the step motor in the reverse direction, and motor drive circuit means for rotationally driving the step motor according to the drive pulses generated by the pulse generator circuit means.

4,697,909
POWER SOURCE DEVICE WITH RESERVE POWER SOURCE FOR CAMERA

Kiyosada Machida, Kanagawa; Yoshiyuki Nakano, and Nobuo Matsukawa, both of Tokyo, all of Japan, assignors to Nippon Kogaku K.K., Japan

Continuation of Ser. No. 568,417, Jan. 5, 1984, abandoned. This application Mar. 13, 1986, Ser. No. 840,470
Claims priority, application Japan, Jan. 6, 1983, 58-301[U]
Int. Cl.[4] B03B 7/26
U.S. Cl. 354—484 15 Claims



1. A device for supplying an electric energy to an electric device of a camera body comprising:

a housing,

means for receiving within said housing a first cell which has a given output voltage sufficient for said electric device to exert its function;

means for receiving within said housing a second cell which has a given output voltage sufficient for said electric device to exert its function;

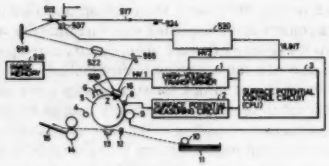
first and second electric contact means disposed individually at different positions on said housing and to be connected to said first and second cells, respectively; and

means, having a first coupling position where said first contact means is electrically connected to said electric device and a second coupling position where said second contact means is electrically connected to said electric device, for coupling said housing to said camera body.

4,697,910
IMAGE PROCESSOR

Yukio Kasuya, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 589,582, Mar. 14, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 873,296
Claims priority, application Japan, Mar. 15, 1983, 58-42821; Mar. 15, 1983, 58-42822; Mar. 15, 1983, 58-42823; Mar. 15, 1983, 58-42824
Int. Cl.[4] G03G 15/04
U.S. Cl. 355—3 R 16 Claims



1. Image processing apparatus comprising:

placing means for placing an original thereon;

a light source for exposing the original;

image forming means for forming images on a recording member in response to light reflected by the original placed on said placing means;

control means disposed in a path through which light is transmitted from said placing means to said recording member for controlling the amount of light transmitted therethrough to said recording member, wherein the light from said light source to said recording member passes through said control means only once;

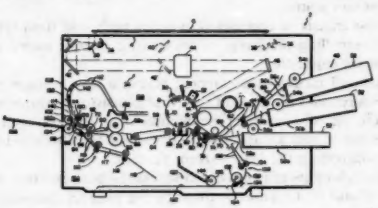
output means for providing an image signal to said control means; and

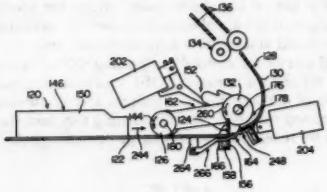
means for switching the apparatus to a first mode for forming images in response to the original or to a second mode for forming images in response to an image signal provided by said output means, wherein in the first mode said control means allows reflected light from the original to be transmitted therethrough to said image forming means so as to form images in response to the original and in the second mode said control means controls the amount of light transmitted therethrough in response to an image signal generated by said output means so as to form images in response to the image signal.

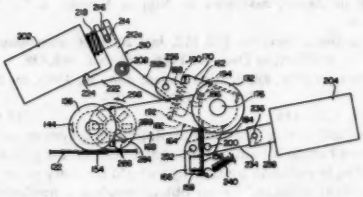
4,697,911
ELECTROSTATIC COPYING APPARATUS

Hiroshi Kajita, Kobe; Koji Ujino, Osaka, and Yoshiyuki Uehara, Yokohama, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Oct. 3, 1985, Ser. No. 783,635
Claims priority, application Japan, Oct. 5, 1984, 59-207940[U]; Oct. 17, 1984, 59-155854[U]; Apr. 30, 1985, 60-91127
Int. Cl.[4] G03G 21/00; B65H 5/06
U.S. Cl. 355—3 SH 28 Claims







1. An electrostatic copying apparatus adapted to introduce selectively a copying paper sheet having an image formed on one surface thereof during conveyance through a copying paper conveying passage into a copying paper returning passage, return the copying paper sheet through the paper returning passage to a copying paper re-sending means disposed below the paper returning passage, and to feed it again to the

paper conveying passage from the re-sending means in order to form an image on the other surface, said re-sending means including a copying paper receiving stand for receiving copying paper sheets having an image formed on one surface in the stacked state, a width matching means for matching the widthwise positions of the copying paper sheets received on the paper receiving stand, and a delivery means disposed above the paper receiving stand; wherein said paper re-sending means further includes an actuating mechanism for maintaining said delivery means selectively in a non-operating state in which it is kept apart from a copying paper sheet received on the paper receiving stand, in a first operating state in which it acts relatively weakly on said copying paper sheet, and in a second operating state in which it acts relatively strongly on said copying paper sheet, and said actuating mechanism maintains the delivery means in the first operating state when the copying paper sheet having an image formed on one surface is received on the paper receiving stand through the returning passage, in the non-operating state when the widthwise positions of the copying paper sheets received on the receiving stand are matched by the action of the width matching means, and in the second operating state when the copying paper sheet received on the paper receiving stand is delivered toward the paper conveying passage.

4,697,912

PROCESS HEAD FOR ELECTROPHOTOGRAPHIC APPARATUS

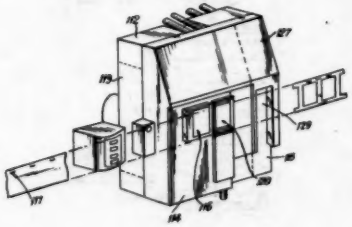
Yoshimitsu Sato; Shuichi Ohtsuka; Akinori Kimura; Akira Yoda, all of Kanagawa; Keishi Kato, and Isoji Takahashi, both of Minami-ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 585,932, Mar. 5, 1984, abandoned. This application Jul. 21, 1986, Ser. No. 885,748

Claims priority, application Japan, Mar. 8, 1983, 58-36581

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—3 R **2 Claims**



1. A processing head for attachment to an electrophotographic apparatus, said processing head comprising adjacent to each other a charging/exposing chamber, a developing chamber, a drying chamber, and a fixing chamber, for recording picture images on electro-photosensitive material, said chambers being respectively provided with windows facing said electro-photosensitive material, said chambers being arranged in a row in the following order: charging/exposing chamber, developing chamber, drying chamber, and fixing chamber in the direction of movement of said electro-photosensitive material, the windows being spaced apart at intervals corresponding to the length of a frame of a picture image formed on said electro-photosensitive material, said charging/exposing chamber comprising charging means inside thereof including a member having fixed thereto a corona wire for charging a picture image area on said electro-photosensitive material, said corona wire being positioned at the center of said electro-photosensitive material facing said window of said charging-/exposing chamber and being straightly stretched with both ends thereof fixed to said member so that said corona wire is parallel to a surface of said electro-photosensitive material, said charging/exposing chamber being located in the optical path of the picture image light for exposing said electro-photosensitive material so that picture image light focusing on said electro-photosensitive material is positioned abuttingly on said charging/exposing window for creating on a surface of the material an electro-static latent image, said developing chamber having a space with an opening for facing said surface and for developing said electro-static latent image by developer supplied to said space; said drying chamber having means for applying air to said electro-photosensitive material to dry the developer; said fixing chamber comprising fixing means for fixing a toner picture image formed on the electro-photosensitive material; at least said member of the charging/exposing chamber where said corona wire is fixed being detachably mounted to said head without changing the position of said charging/exposing window in said light path.

4,697,913

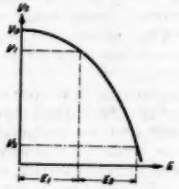
COPYING APPARATUS FOR SYNTHESIZING IMAGES

Yukimasa Kuramoto, Hyogo; Hajimu Oonishi, Osaka; Yukio Sakai, Osaka; Yoshiki Hayashi, Osaka, all of Japan, and Robert C. Wells, Arlington, Mass., assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 503,746, Jun. 13, 1983, abandoned. This application May 19, 1986, Ser. No. 866,995

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—3 R **8 Claims**



1. A copy apparatus for creating images from at least two separate positive image sources on a single sheet of copying paper, comprising:

a photosensitive body having a photosensitive surface characterized by a surface electric potential versus light exposure in which the electric potential changes from about a maximum value to an inoperative value for copying for a light exposure of a given amount, and the electric potential changes from about a maximum value to a substantial equivalent value for copying for light exposure of about half the given amount;

means for creating a substantially maximum electric potential on said photosensitive surface;

means for exposing said photosensitive surface to light corresponding to a first positive image source to create first and second portions of said photosensitive surface, said first portions corresponding to the relatively dark parts of said first positive image and having an electric potential substantially unchanged from said maximum electric potential, said second portion corresponding to relatively light parts of said first positive image and having an electric potential substantially equivalent to said maximum electric potential for copying,

means for exposing said photosensitive surface to light corresponding to a second positive image source so that the electric potential of said first portion is reduced but substantially equivalent to said maximum electric potential for copying, and the electric potential of said second portion corresponding to the relatively dark parts of said second positive image having an electric potential substantially equivalent to said maximum electric potential for copying while the remainder of said second portion is reduced to an inoperative value for copying; and

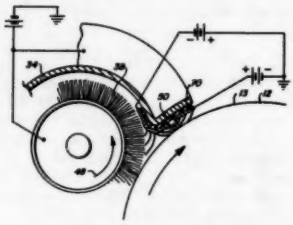
means for transferring the information in said photosensitive surface to a single sheet of paper to produce images corresponding to said first and second positive images.

4,697,914

TONER CONTAINMENT METHOD AND APPARATUS

Oscar G. Hauser, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 30, 1982, Ser. No. 393,892
Int. Cl.[4] G03G *15/08, 13/08*
U.S. Cl. 355—3 DD 1 Claim



1. An electrostatographic reproducing apparatus comprising an imaging member having an imaging surface capable of supporting an electrostatic latent image comprising image portions of a first charge polarity and magnitude and non-image portions of the same polarity and substantially less magnitude than said image portions,

a developer housing comprising an open ended chamber for storing toner particles charged to a polarity opposite said first polarity, said chamber containing magnetic field producing means mounted internally and positioned closely adjacent said imaging surface, said magnetic field producing means forming a brush like array of charged toner particles extending outwardly from the open end of the chamber of said developer housing in brushing contact in the same direction with the electrostatic latent image on said imaging surface to form an electrostatic latent image development zone,

said developer housing having an exit portion at the imaging surface exit to the development zone through which air normally flows from the housing to other portions of the machine,

said developer housing being provided at said exit portion with at least one electrode electrically insulated therefrom and extending across the width of and spaced from the imaging surface,

means to apply an electrical bias to said electrode of a polarity and magnitude selected relative to the charge on the imaging surface to create an electrical field barrier in said exit portion sufficient to repel the charged toner particles in the exiting air back into the principal portion of the developer housing substantially without restricting the air flow from said exit portion,

means to apply an electrical bias to said developer housing of a polarity and magnitude to create an electrical field between said electrode and said developer housing which repels charged toner particles back into the principal portion of the developer housing, and

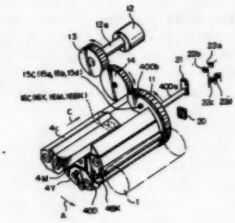
a nulling electrode electrically insulated from said first electrode and space between said first electrode and said imaging surface and further including means to bias said nulling electrode to a polarity and magnitude equal to the non-image areas on said imaging surface whereby the electric field between said imaging surface and said nulling electrode is substantially nullified thereby minimizing deposition of charged toner particles in said non-image areas.

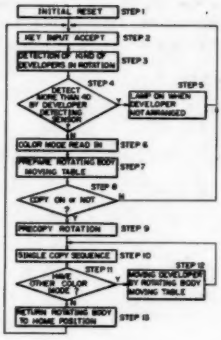
4,697,915

IMAGE FORMING APPARATUS WITH DETECTING AND CONTROLLING MEANS

Kimiyoshi Hayashi; Akio Ohno; Kazuhiko Hirooka, and Yasushi Murayama, all of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1985, Ser. No. 813,066
Claims priority, application Japan, Dec. 26, 1984, 59-273280
Int. Cl.[4] G03G *15/06*
U.S. Cl. 355—14 D 7 Claims





1. An image forming apparatus comprising:

a latent image bearing member;

latent image forming means for forming on said latent image bearing member a latent image corresponding to image information;

developing means for developing the latent image formed on said latent image bearing member, said developing means having a plurality of developing devices and a rotating body for removably carrying said plurality of developing devices thereon;

drive means for rotatively driving said rotating body;

detecting means for detecting whether said plurality of developing devices are carried on said rotating body; and

control means adapted to permit an image forming operation only when said detecting means detects that all of said plurality of developing devices are carried on said rotating body.

4,697,916
IMAGE FORMING APPARATUS

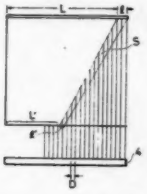
Yutaka Komiya, Tokyo; Masahiro Tomosada, Kawasaki; Shinichi Nakamura, Tokyo; Masanori Miyata; Masayuki Hirose, both of Yokohama, and Hideki Adachi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 772,164, Sep. 3, 1985, abandoned, which is a continuation of Ser. No. 532,143, Sep. 14, 1983, abandoned. This application Jun. 5, 1986, Ser. No. 870,907

Claims priority, application Japan, Sep. 25, 1982, 57-165991; Sep. 25, 1982, 57-165992

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—14 E **9 Claims**



1. An image forming apparatus comprising:

latent image forming means for forming a latent image corresponding to an original on a photosensitive medium, wherein the size of said latent image is varied continuously in accordance with selected magnification;

reference latent image forming means for forming a reference latent image which is not to be developed, adjacent to said latent image, said reference latent image having a width dimension formed in accordance with the selected magnification;

a plurality of light-emitting means disposed at intervals of a pitch equal to or smaller than the width dimension of said reference latent image as determined by a selected minimum magnification;

means for controlling said plurality of light-emitting means in accordance with the size of said latent image of the original.

4,697,917
COPYING MACHINE

Yoshiaki Takano, and Keichi Kinoshita, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 9, 1985, Ser. No. 764,422

Claims priority, application Japan, Aug. 9, 1984, 59-167311; Jun. 12, 1985, 60-129058

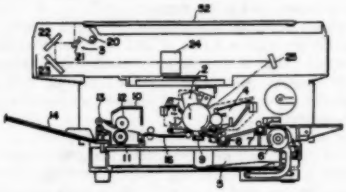
Int. Cl.⁴ G03G *15/04, 21/00*

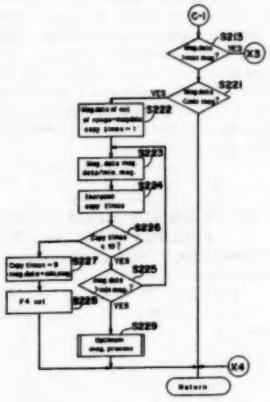
U.S. Cl. 355—14 R **31 Claims**

1. A copying machine with a variable magnification capability and a predetermined range of magnification values which comprises:

means for entering copying magnification data including magnification data out of the said predetermined range,

means for calculating a number of copying operations for obtaining a copy with said entered magnification, when said entered magnification is out of the predetermined range, by repeating the copy operation of said number, each time using an original which is a previously copied material magnified with a magnification within said predetermined range, and





means for displaying said calculated number of copying operations.

4,697,918
PHOTOGRAPHIC PAPER ACCOMMODATING APPARATUS

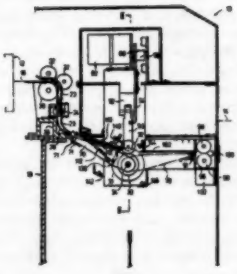
Mikio Kogane, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 30, 1986, Ser. No. 925,056

Claims priority, application Japan, Oct. 30, 1985, 60-243690

Int. Cl.⁴ G03B *27/32*

U.S. Cl. 355—27 **19 Claims**



1. A photographic paper accommodating apparatus which is disposed on the downstream side of a printing section for transporting an exposed continuous photographic paper to a subsequent step, comprising:

(a) first clamping and transporting roller means disposed on the downstream side of said printing section so as to clamp and transport said photographic paper and form a first loop of said photographic paper between said printing section and said roller means;

(b) second clamping and transporting roller means disposed on the downstream side of said first clamping and transporting roller means so as to clamp and transport said photographic paper and form a second loop of said photographic paper between said first and second clamping and transporting roller means;

(c) a guide member movable between a first position at which said guide member guides said photographic paper toward said first clamping and transporting roller means, and a second position at which said guide member guides said photographic paper toward said second clamping and transporting roller means;

(d) first sensor means for detecting whether or not the leading end of said photographic paper has been clamped by said first clamping and transporting roller means; and

(e) second sensor means for detecting whether or not the trailing end of said photographic paper has been delivered from said first clamping and transporting roller means,

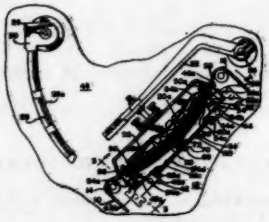
whereby it is possible to maintain normal transport of said photographic paper from said printing section to the subsequent step.

4,697,919

FILM DEVELOPING SYSTEM FOR MICROIMAGE RECORDING APPARATUS

Heinz E. Hertel, Mount Prospect, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Nov. 28, 1986, Ser. No. 935,875
Int. Cl.[4] G03B 17/50, 27/32; H05B 1/00
U.S. Cl. 355—27 20 Claims



1. In a microimage recording apparatus of the type including an elongated film strip movable under tension along a film path, said film strip of the type utilizing heat for developing latent image areas formed on said film strip at an exposure station, an improved developing station comprising:

means for supporting said film strip along said path between spaced apart support lines extending transversely of said film strip on opposite ends of a previously exposed latent image area thereon in position ready for developing;

developer shoe means having an outwardly convex heated surface adapted to contact a facing surface of said film strip between said support lines for developing said latent image area;

said developer shoe means mounted for movement between a first position spaced away from said film path and a second, film developing position wherein said film strip is tensioned between said transverse support lines and is biased into intimate conforming heated contact against said convex surface for a selected time period to develop said latent image area; and

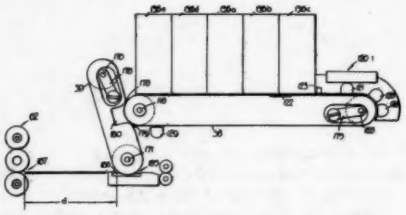
backup means between said support lines spaced from and adjacent an opposite surface of said film strip for retaining heat provided by said developer shoe means while in contact with said film strip, said backup means including a replaceable collection element adapted to collect and retain any residue formed on said film strip at said developing station.

4,697,920

IMPROVED PRINT QUALITY MONITORING FOR COLOR ELECTROPHOTOGRAPHY

Charles S. Palm, Norcross; Danny L. Slayton, Lilburn; Khosrow Lak; Peter F. Sampson, both of Doraville; David R. Davis, Buford; Maurice S. Wheatley, Jr., Duluth; Gregory A. Chatham, Marietta; Wayne C. Jones, Duluth; Kirk W. Charles, Atlanta, all of Ga., and Anthony J. Ireland, El Cerrito, Calif., assignors to Colorocs Corporation, Norcross, Ga.

Division of Ser. No. 791,218, Oct. 25, 1985, Pat. No. 4,652,115.
This application Nov. 10, 1986, Ser. No. 929,329
Int. Cl.[4] G03G 15/01, 15/048
U.S. Cl. 355—14 CH 2 Claims



1. In a color print engine for use in an electrophotographic system of the type including means for selectively focusing light onto a photosensitive receptor carried on a first rotating surface and for sequentially creating a plurality of electrostatic images on said photosensitive receptor in response to said light, each of said images corresponding to a particular one of a plurality of predetermined color components; a selectively operable corona for providing an electrostatic charge on said photosensitive receptor in response to a corona input voltage;

drive means for causing said first rotating surface to rotate;

means for developing each of said plurality of images with a particular one of a plurality of toners, each of said plurality of toners corresponding to each respective particular color component, to sequentially provide a plurality of developed images on said photosensitive receptor;

means for sequentially transferring said plurality of developed images to a transfer medium carried on a second rotating surface in contact with said first rotating surface to provide a composite developed image on said transfer medium;

means for transferring said composite developed image to an image receptor;

fuser means for fixing said developed image onto said image receptor as said image receptor passes through said fuser means;

an improved print quality monitoring system comprising in combination;

reference means for providing a plurality of electrostatic test images on said photosensitive receptor, each of said electrostatic test images corresponding to a particular one of said plurality of predetermined color components and being at a respective predetermined location on said first rotating surface and for providing a developed electrostatic test image in response to each said electrostatic test image using a respective one of said plurality of toners;

optical detector means including a selectively operable source of light and a photoreceptor disposed near said first rotating surface for, respectively, illuminating a predetermined portion of said first rotating surface and measuring light reflected from said first rotating surface, and for providing an output signal in response to said light reflected from said first rotating surface;

control means connected to said drive means, said optical detector means and said corona for detecting passage of each said respective predetermined location on said first rotating surface by said optical detector means and for controlling said corona input voltage in response to each said output signal produced in response to each respective said developed electrostatic test image.

4,697,921

DEVICE FOR DETECTING A RELATIVE CHANGE IN DISTANCE BETWEEN TWO MEASURING POINTS, AND ITS USE

Rudolf Amberg, and Werner Alder, both of Sargans, Switzerland, assignors to Amberg Messtechnik AG, Sargans, Switzerland

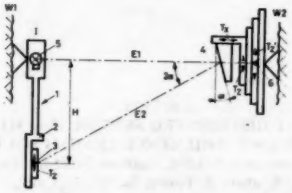
PCT No. PCT/CH84/00007, § 371 Date Sep. 12, 1984, § 102(e) Date Sep. 12, 1984, PCT Pub. No. WO84/02771, PCT Pub. Date Jul. 19, 1984

PCT Filed Jan. 13, 1984, Ser. No. 654,018

Claims priority, application Switzerland, Jan. 13, 1983, 182/83

Int. Cl.⁴ G01C *3/24*

U.S. Cl. 356—15 **9 Claims**



1. In a device for detecting a change in distance between two measuring points by emitting a light beam at a first measuring point, reflecting the light beam at a second measuring point and detecting any change which may occur, the improvement comprising that a pendulum suspended on gimbals at a pendulum suspension is located at the first measuring point, a light emitter being arranged at the suspension and a light receiver or a light reflector being arranged at the free end of the pendulum.

4,697,922

DUAL MODE LASER VELOCIMETER

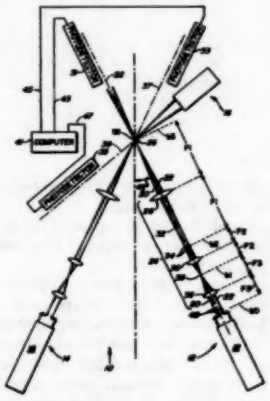
William D. Gunter, Jr., San Jose; Ralph W. Donaldson, and Alma G. Anderson, Jr., both of Sunnyvale, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 31, 1986, Ser. No. 846,427

Int. Cl.⁴ G01P *3/36*; G02B *27/00*

U.S. Cl. 356—28.5 **5 Claims**

1. A laser velocimeter, which comprises means for generating first and second laser beams having a waist of reduced cross section area, a first focusing lens having a first focal length for focusing the first and second laser beams so that their waists intersect at a focal point at which a measurement is to be made, a second focusing lens positioned between said laser beam generating means and said first focusing lens, said second focusing lens having a second focal length, said second focusing lens being positioned between said laser beam generating means and said first focusing lens at a distance corresponding to an algebraic sum of the first and the second focal length from said first focusing lens, a third focusing lens having a third focal length positioned between said laser beam generating means and said second focusing lens, said third focusing lens being positoned from said second focusing lens a distance corresponding to an algebraic sum of the second and third focal lengths, said third focusing lens being positioned in front of the beam waists generated by said laser beam generating means a distance corresponding to the third focal length, said first, second and third focusing lenses coacting when so positioned to focus the first and second laser beams so that their waists focused by said first focusing lens intersect at a first focus spot size, said second and third lenses being interchangeable in relative position in said velocimeter with adjustment of location of said second and third lenses when interchanged so that each of said second and third lenses is its own focal length



from adjacent beam waists generated by said laser beam generating means and output beam waists generated by said second and third lenses, to focus the first and second laser beams so that their waists focused by said first focusing lens intersect at a second focus spot size different than the first focus spot size, means to collect light scattered in said laser velocimeter to produce signals derived from the scattered light, and means for processing the signals to reduce the signals to velocity components of the scattered light.

4,697,923

METHOD FOR VISUAL INSPECTION OF MULTILAYER PRINTED CIRCUIT BOARDS

Gerald W. Jones, Johnson City; W. Robert Pratt, Binghamton, and William J. Summa, Endwell, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Mar. 25, 1986, Ser. No. 843,566

Int. Cl.⁴ G01N *21/88*

U.S. Cl. 356—239 **5 Claims**

1. A method for the visual inspection of the electrical circuitry embedded in the layers of a multilayer printed circuit board which comprises:

preparing the multilayer printed circuit board from a composite of circuitized metal and dielectric layers, the dielectric layers being formed using a clear, light transparent thermosetting resin having incorporated therein a selective light absorbing dye having the property of absorbing ultaviolet light of 320 to 440 nm wavelength and permeable to the passage of visible light; and

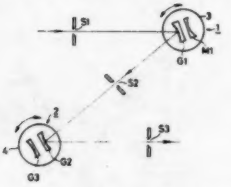
exposing the multilayer printed circuit board to a source of visible light to permit visual inspection of the board.

4,697,924

MONOCHROMATOR

Osamu Akiyama, Kyoto, Japan, assignor to Shimadzu Corporation, Kyoto, Japan

Filed Mar. 29, 1985, Ser. No. 718,124
Claims priority, application Japan, Mar. 30, 1984, 59-64771
Int. Cl.[4] G01J 3/18
U.S. Cl. 356—333 8 Claims



1. A monochromator defining an optical path therethrough, said monochromator comprising:

an entrance grid, having an entrance slit and being positioned such that said entrance slit is at the beginning of said optical path;

a first spectroscope, positioned on said optical path after said entrance grid, said first spectroscope comprising at least a first reflective element for reflecting light along said optical path and a first dispersion element for diffracting light along said optical path, said first reflective element and said first dispersion element being disposed on a first rotary bed rotatable about a first axis, one of said first reflective element and said first dispersion element being alternatively selectable by rotating said rotary bed;

an intermediate grid, having an intermediate slit and being positioned after said first spectroscope along said optical path, said first spectroscope directing light from said entrance slit to said intermediate slit;

a second spectroscope positioned on said optical path after said intermediate grid, said second spectroscope comprising at least a second dispersion element for diffracting light along said optical path, said second dispersion element being disposed on a second rotary bed rotatable about a second axis; and

an exit grid, having an exit slit and being positioned on said optical path after said second spectroscope, said second spectroscope directing light from said intermediate slit to said exit slit.

4,697,925

METHOD OF MEASUREMENT USING SCATTERED LIGHT

Hiroshi Hyodo, Kyoto; Naoki Yamada; Kenichi Iwase, both of Joyo, and Shinichi Kishimoto, Kuze, all of Japan, assignors to Kabushiki Kaisha Kyoto Daiichi Kagaku, Japan

Filed Oct. 29, 1984, Ser. No. 665,623
Claims priority, application Japan, Nov. 4, 1983, 58-207728
Int. Cl.[4] G01N 21/00
U.S. Cl. 356—339 12 Claims

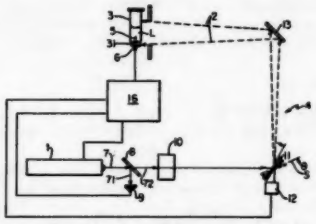
1. A method of measurement using scattered light comprising the steps of:

scanning during each one of a plurality of successive scanning times each one of a plurality of sections of a test solution in a measuring cell with a minute light flux;

measuring the intensity of scattered light produced successively in each of said plurality of sections of the test solution during each successive scanning time;

producing from said successive measurements over time of the intensity of light from each of said plurality of sections of the test solution, an individual curve of light intensity versus time for each of said sections; and

determining either the concentration or detecting the reaction process of the test solution from the average of a



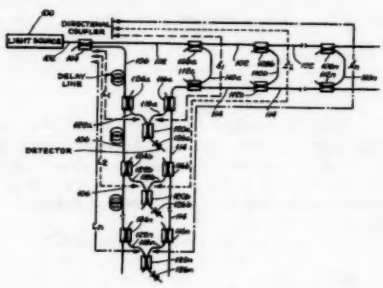
combination of said individual curves of light intensity versus time.

4,697,926

COHERENT DISTRIBUTED SENSOR AND METHOD USING SHORT COHERENCE LENGTH SOURCES

Robert C. Youngquist, London, England; Janet L. Brooks, Stanford, Calif.; Kenneth A. Fesler, Sunnyvale, Calif.; Cassius C. Cutler, Palo Alto, Calif., and Herbert J. Shaw, Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Conn.

Filed Feb. 8, 1985, Ser. No. 699,855
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—345 26 Claims



24. An apparatus for remotely sensing environmental effects on a plurality of sensors comprising:

a light source;

a receiving optical fiber;

a plurality of optical fiber sensors optically coupled at a first end to the light source and at a second end to the receiving optical fiber, and each conducting light received from the light source along optical paths of different lengths which paths each terminate at a coupling location on said receiving optical fiber; and

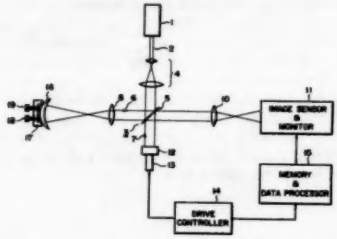
means optically connected to said coupling location for combining light signals received from said receiving optical fiber so that light signals which interfere produce a signal directly indicating the difference between the environmental influence sampled at two different sensors.

4,697,927

METHOD AND APPARATUS FOR MEASURING A FORMING ERROR OF AN OBJECT

Akira Ono, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 29, 1985, Ser. No. 802,743
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—360 43 Claims



1. A method of measuring a forming error of an object to be measured comprising the steps of:

(a) generating a coherent lioht beam;

(b) making a beam of said coherent light beam which is reflected from a reference surface as a reference beam interfere with a beam reflected from a measuring surface of said measuring object as an object beam, thereby producing an interference fringe;

(c) measuring an actual phase difference between said reflected beam and said object beam based on the derived interference fringe;

(d) determining a theoretical phase difference between an ideal object beam which is obtained when said object is assumed ideal and an ideal reference beam which is obtained when said reference surface is assumed ideal; and

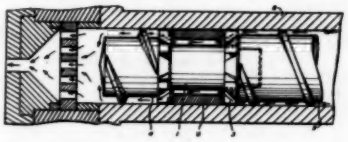
(e) obtaining a forming error of said actual object based on said actual and theoretical phase differences.

4,697,928

MODULAR MIXING APPARATUS INCLUDING INTERCHANGEABLE FLUID PROCESSING MEANS

Desider G. Csongor, Rangeley, Me., assignor to Northern Lights Trust of February 14, 1978, Rangeley, Me.

Continuation of Ser. No. 565,376, Dec. 27, 1983, which is a division of Ser. No. 298,065, Aug. 31, 1981, abandoned. This application Nov. 29, 1985, Ser. No. 803,510
Int. Cl.[4] B01F 7/08; B29B 1/06
U.S. Cl. 366—80 10 Claims



1. A method of processing a thermoplastic fluid mixture in a modular mixing apparatus

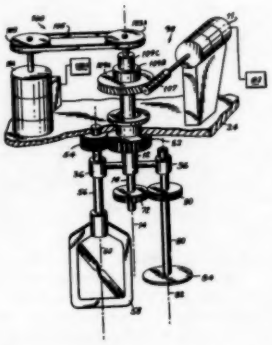
characterized by dividing a helically moving mass of the fluid mixture into a plurality of circumferentially spaced apart streams of material, guiding the spaced apart streams of material along generally axially paths of travel and then cutting across the spaced apart streams of material to carry out subdivision of the separated streams of material, then discharging the subdivided material as a homogeneous mass into a die member.

4,697,929

PLANETARY MIXERS

Warren E. Muller, West Hempstead, N.Y., assignor to Charles Ross & Son Company, Hauppauge, N.Y.

Filed Oct. 28, 1986, Ser. No. 923,845
Int. Cl.[4] B01F 7/16; B28C 1/16
U.S. Cl. 366—97 15 Claims



1. An epicyclic mixer system, comprising, in combination,

support means,

a first housing fixed to said support means,

a second housing connected to said first housing and rotatable about a central axis,

first sun drive shaft means positioned in and secured to said first housing, said first sun drive shaft means being rotatable about its own axis which is said central axis and having a cylindrical bore axially aligned with said central axis,

second sun drive shaft means mounted in and rotatable within said bore about its own axis which is said central axis,

drive means connected to said support means for rotating said first and second sun drive shafts,

a first planetary shaft positioned in said second housing and rotatable within said second housing about its own first planetary axis spaced from and parallel to said central axis, said first planetary shaft having opposed ends including one end external of said second housing,

first gear means connected to said first planetary shaft and to said first housing for rotating said first planetary shaft about said first planetary axis,

a second planetary shaft positioned in said second housing and rotatable within said second housing about its own second planetary axis spaced from and approximately parallel to said first planetary axis, said second planetary shaft having opposed ends including one end external of said second housing,

second gear means connected to said second sun drive shaft means and to said second planetary shaft for rotating said second planetary shaft about said second planetary axis,

speed control means operatively connected to said drive means and to said first and second gear means for controlling the rotational speed of each said first and second sun drive shaft means independently of the other,

said first sun drive shaft means being for rotating said first planetary shaft about said first planetary axis by way of said first gear means, and said second sun drive shaft means being for rotating said second planetary shaft about said second planetary axis by way of said second gear means, said first sun drive shaft means also being for orbiting said second housing with said first and second planetary shafts about said central axis.

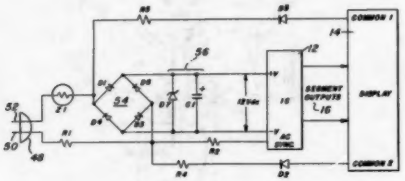
4,697,930
TRANSFORMERLESS CLOCK CIRCUIT WITH DUPLEX OPTOELECTRONIC DISPLAY

Patrick S. Roberts, Rolling Meadows, and Leonard Weiss, Grayslake, both of Ill., assignors to Spartus Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 881,862, Jul. 8, 1986, abandoned. This application Aug. 28, 1986, Ser. No. 902,003

Int. Cl.[4] G04C *19/00;* **G04B** *1/00*

U.S. Cl. 368—82 **34 Claims**



1. In a clock circuit having a duplex optoelectronic display driven by a low voltage integrated circuit having positive and negative voltage input terminals, the duplex display having a first terminal connected to a first common cathode thereof and a second terminal connected to a second common cathode thereof for energizing the display, a transformerless power supply circuit comprising

(a) means for connecting the circuit to an AC source,

(b) means for reducing the AC input voltage to a level usable by the integrated circuit,

(c) means for applying a reference voltage to the integrated circuit and the display second terminal,

(d) circuit means connected to the means for reducing the AC voltage, the integrated circuit voltage input terminals and the first and second terminals of the duplex display for driving the positive input terminal of the integrated circuit alternately between a first voltage and a reference voltage while synchronously driving the display first terminal between said first voltage and a voltage of equal amplitude and opposite polarity.

4,697,931
ELECTRONIC TIMEPIECE INCLUDING SLIDABLE DIGITAL DISPLAY SECTIONS

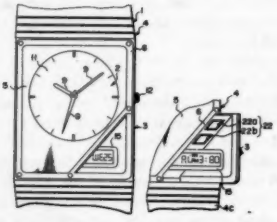
Masayoshi Okuyama; Yukio Kido; Isao Mimura, and Etsuro Nakajima, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Oct. 23, 1986, Ser. No. 923,394

Claims priority, application Japan, Oct. 28, 1985, 60-239462; Dec. 2, 1985, 60-269321

Int. Cl.[4] G04B *19/00, 37/00*

U.S. Cl. 368—223 **25 Claims**



1. An electronic timepiece comprising:

a timepiece case;

an electronic circuit, provided inside said timepiece case, for outputting a plurality of data items containing time data;

a slidable member arranged inside said timepiece case, including an optical display unit, and slidable to at least first and second stop positions, said optical display unit being exposed to the outside of said timepiece case with having a larger display region when said slidable member has been slid to the second stop position rather than to the first stop position;

detecting means for detecting that said slidable member has been slid to the first and second stop positions, respectively;

first data supply means for supplying one data item of said plurality of data items output from said electronic circuit to said exposed optical display unit when said detecting means detects that said slidable member has been slid to the first stop position; and

second data supply means for supplying another data item of said plurality of data items output from said electronic circuit to said exposed optical display unit when said detecting means detects that said slidable member has been slid to the first stop position.

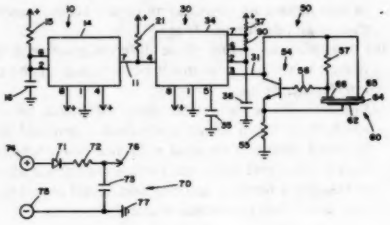
4,697,932
MULTI-SIGNAL ALARM

Miroslav Matievic, Indianapolis, Ind., assignor to Emhart Industries, Inc., Indianapolis, Ind.

Filed Dec. 11, 1985, Ser. No. 807,687

Int. Cl.[4] G04C *21/16*

U.S. Cl. 368—255 **4 Claims**



1. A signaling device comprising:

a timer means for producing a timer signal defining a predetermined time;

a pulser means responsive to said timer signal for producing pulse signals at a predetermined rate during said predetermined time:

electrical oscillator means including a piezoelectric transducer and responsive to said pulse signals for producing a predetermined number of audio signals, said electrical oscillator means having a frequency of oscillation different than said predetermined rate of said pulser means.

4,697,933
FLUID BEARING ASSEMBLY

Kunihiko Morita, Koganei, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1986, Ser. No. 846,326

Int. Cl.[4] F16C *32/06, 37/00*

U.S. Cl. 384—12 **4 Claims**

1. A fluid bearing assembly comprising:

a first element having a first surface;

a second element having a second surface facing said first surface with said fluid sandwiched therebetween;

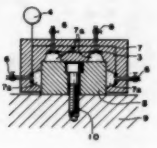
reservoir means provided in at least either one of said first and second surfaces for maintaining therein a quantity of fluid, wherein said reservoir means includes at least one recess formed in at least one of said first and second surfaces;

said reservoir means further comprising a plenum chamber in fluidic communication with said recess and a working

chamber in fluidic communication with said plenum chamber through an intermediate valve; and

heating means for heating said fluid so as to have the fluid in said reservoir means pressurized;

wherein said first element is a rail extending straight over a



predetermined distance and having at least one first flat surface as said first surface and said second element is a table which is mounted on said rail in a straddling manner and has at least one second flat surface as said second surface, whereby said table may move along said rail with said fluid sandwiched therebetween.

4,697,934

GUIDE MECHANISM, PARTICULARLY FOR SLIDING FURNITURE PARTS

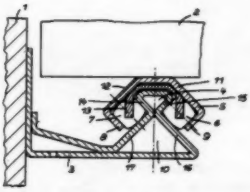
Roland Hölzle, Haiterbach, Fed. Rep. of Germany, assignor to Häfele KG, Fed. Rep. of Germany

Filed Feb. 20, 1986, Ser. No. 831,972

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 3505786

Int. Cl.⁴ F16C *29/04*

U.S. Cl. 384—19 **15 Claims**



1. A guide mechanism for guiding two relatively movable parts, in particular for furniture, comprising an inner runner for connection to one of the parts, said inner runner having at least two track surfaces, an outer runner for connection to the other part, said outer runner having at least two track surfaces which at least partly cover said track surfaces of said inner runner, each track surface of said outer runner being parallel to and facing one track surface of said inner runner, said track surfaces of said inner and outer runners together defining a track space, and a plurality of rollers in said track space, each roller having a rotation axis and each mounted for rolling against and between facing track surfaces of said inner and outer runners, said rollers being disposed in groups along said track space with at least one roller in each group, and each group rolling against and between alternating track surfaces of said inner and outer runners along said track space, said inner and outer runners each have two additional track surfaces with each additional track surface of said outer runner being parallel to and facing one additional track surface of said inner runner, said additional track surfaces defining an additional track space, said inner runner having a top triangle portion defining two track surfaces of said inner runner, said outer runner engaged over said top triangle portion and defining with said top triangle portion said first mentioned and additional track spaces.

4,697,935

CROSSED-ROLLER RETAINER

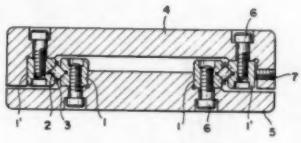
Toru Yasui, Gifu, Japan, assignor to Nippon Thompson, Co. Ltd., Tokyo, Japan

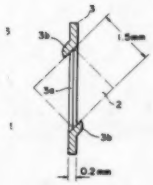
Filed May 9, 1986, Ser. No. 861,691

Claims priority, application Japan, May 10, 1985, 60-97970

Int. Cl.⁴ F16C *29/04*

U.S. Cl. 384—47 **9 Claims**





1. A plate-shaped retainer for retaining a roller in an inclined orientation comprising:

at least one hole of defined shape in said retainer;

a pair of projections provided in said hole for holding a roller with an axis of rotation inclined with respect to a plane defined by said retainer, said pair of projections providing a pair of contact surface portions for holding said roller in position; and

an integral double-tapered surface provided in at least a part of an inner peripheral wall which defines said hole, said double-tapered surface forming an inwardly extending ridge for providing additional contact surface portions for holding said roller in position.

4,697,936

BEARING WITH REINFORCED AND VENTED SEAL

Gabriele Bermond, Pinerolo, and Angelo Vignotto, Turin, both of Italy, assignors to RIV-SKF Officine Di Villar Perosa S.p.A., Italy

Filed Apr. 11, 1986, Ser. No. 850,858

Claims priority, application Italy, Apr. 23, 1985, 53298/85[U]

Int. Cl.⁴ F16C *33/78*; F16J *9/00*

U.S. Cl. 384—484 **8 Claims**

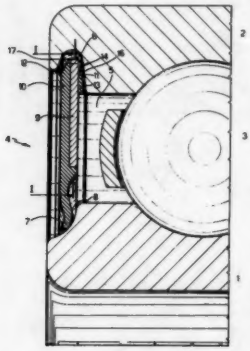
1. A sealed roller bearing comprising:

an inner ring and an outer ring;

a row of rolling bodies inserted between the inner ring and the outer ring; and,

a seal including a pair of sealing rings, the sealing rings presenting at least one radial lip designed to rest and slide on a corresponding surface of the inner ring and being inserted into an annular groove formed on the outer ring, the groove on the outer ring presenting, on a side of the groove facing the row of rolling bodies, a first tapered shoulder surface for one of the pair of sealing rings and, on an opposite side thereof, a second shoulder surface for the other of the pair of sealing rings, each said sealing ring being made of deformable material and the seal having a

metal annular strengthening member and a first layer of the deformable material arranged over the strengthening member, on a side facing outwards of the bearing, and being designed to rest on the second shoulder surface, the seal having a second layer of the deformable material arranged over the strengthening member on an opposite side to that on which is arranged the first layer, the second layer being defined by a tapered surface designed to rest on the first shoulder surface, passages for the deformable material being formed on the strengthening member in such a manner as to connect the first layer and the second layer by means of the deformable material filling the



passages, and outside diameters of the first layer and the second layer being equal to an outside diameter of the strengthening member, the first and second layers being provided with slots substantially located in meridian planes on the sealing ring and being designed to connect a gap between the bearing rings with the annular groove on the outer ring, and to connect the annular groove with an outside atmosphere, the meridian planes containing the slots on the first layer forming prearranged angles with respect to the meridian planes containing the slots on the second layer, whereby a route is formed from said gap to the outside atmosphere having a high resistance to passage.

4,697,937

BEARING ARRANGEMENT WITH A SEAL

Ove Karlsson; Sture Östling, both of Katrineholm, and Rune Adolfsson, Borås, all of Sweden, assignors to SKF Mekanprodukter AB, Katrineholm, Sweden

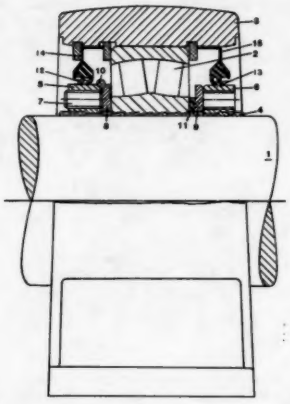
Filed Dec. 4, 1986, Ser. No. 937,830

Claims priority, application Sweden, Jan. 24, 1986, 8600310

Int. Cl.[4] F16C *19/38*

U.S. Cl. 384—486 **3 Claims**

1. A device for mounting a bearing (2) on a shaft (1) in a housig (3), comprising a tapered clamping sleeve (4) provided between the bearing and the shaft, the sleeve having a longitudinal slit and a flange (5, 6) arranged on either side of the bearing, sealing members (12, 13, 14, 15) being arranged in the housing radially outside of and surrounding the flanges, sealing lips (12, 13) contacting the outer surfaces of the flanges and members (7) for moving the bearing axially on the sleeve during mounting and dismounting of the bearing being provided in the flanges, characterized by a sealing part (11, 9) arranged between the bearing and the flange (6) situated adjacent the large end of the tapered portion of the sleeve (4), the sealing part being compressible in the direction of motion of the bearing during mounting on the sleeve and sealingly abutting the bearing and the flange, and a resilient sealing ring (10) provided in a groove with a variable width and limited partly by the flange (5) situated adjacent the small end of the tapered



portion of the sleeve and partly by the bearing (2) or a washer (8) situated adjacent and sealingly abutting the bearing.

4,697,938

MULTI-TINT THERMAL PRINTING APPARATUS CONTROL SYSTEM

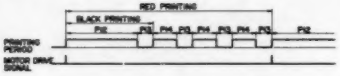
Yasuhiro Sakura, Mishima; Koichi Haraga, Numazu; Hitoshi Nimura, Shizuoka, and Mamoru Ishikawa, Fuji, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 721,570, Apr. 10, 1985, abandoned. This application Sep. 4, 1986, Ser. No. 904,781

Claims priority, application Japan, Apr. 17, 1984, 59-76899; Feb. 28, 1985, 60-39606

Int. Cl.[4] B41J *3/20*

U.S. Cl. 400—120 **6 Claims**



1. A printing apparatus, comprising:

heating means having N heating elements arranged in a line and which are selectively energized in accordance with input N-bit data;

driving means for supplying the N-bit data to said heating means in accordance with input drive data;

at least first and second memory means for respectively storing first and second printing data having a plurality of line printing data to be printed on a label by said heating elements; and

control means including means for reading out printing data of one line from each of said first and second memory means, first supply means for supplying to said driving means drive data corresponding to a logical sum of the printing data of one line read out from said first memory means and that read out from said second memory means, thereby causing said driving means to supply N-bit data from said first supply means to said heating means during a first printing period of each line printing cycle, and second supply means for supplying to said driving means drive data corresponding to the printing data of said one line read out from said first memory means, thereby causing said driving means to supply N-bit from said second

supply means to said heating means during a second printing period of said line printing cycle;

said first printing data stored in said first memory means including special information data;

said control means further includes means for setting a different printing mode upon detection that the printing data of one line stored in said first memory means does not include a part of said special information data;

wherein in said different printing mode, each line printing cycle comprises a third printing period shorter than said first printing period; and

said control means further includes means for supplying to said driving means, during said third printing period, drive data corresponding to the printing data of one line stored in said second memory means.

4,697,939

WIRE DOT PRINTER WITH IMPROVED WIRE DOT HEAD

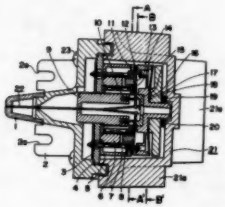
Yoji Ara, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 531,336, Sep. 12, 1983, abandoned. This application Jan. 27, 1986, Ser. No. 822,953

Claims priority, application Japan, Sep. 17, 1982, 57-160930; Sep. 30, 1982, 57-169837; Sep. 30, 1982, 57-169838; Sep. 30, 1982, 57-169839

Int. Cl.[4] B41J *3/12*

U.S. Cl. 400—124 **3 Claims**



1. A wire dot printer having a wire dot head comprising:

a plurality of armatures provided correspondingly to a plurality of wires and held so as to be reciprocally pivotable about a fulcrum;

an electromagnet for attracting said armatures for pivotably moving said armatures and driving said wires;

a stopper formed of a material having elasticity for stopping said armatures when they pivot for return;

shock absorbing means for alleviating the shock with which said armatures strike against stopper, said shock absorbing means formed of a material having a greater specific gravity than that of the material of said stopper, and said shock absorbing means being resiliently urged by a spring member toward said stopper; and

holding means for pivotably holding said plurality of armatures, said holding means being urged by said spring member to hold said armatures.

4,697,940

LETTERING APPARATUS

Franklin C. Bradshaw, Scottsdale, and Patrick M. Maloney, Fountain Hills, both of Ariz., assignors to Kroy Inc., St. Paul, Minn.

Continuation of Ser. No. 549,262, Nov. 4, 1983, abandoned. This application Apr. 17, 1986, Ser. No. 853,028

Int. Cl.[4] B61J *32/00*

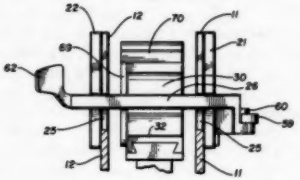
U.S. Cl. 400—134.6 **9 Claims**

1. A lettering apparatus adapted for receiving a replaceable tape supply cartridge of the type having a pair of spaced apart side walls and a tape supply therebetween in which said tape supply includes a supply of tape having a pair of side edges disposed generally parallel to said spaced apart side walls, said apparatus comprising:

a pair of parallel, spaced apart frame members defining a cartridge receiving cavity therebetween for receiving said tape supply cartridge between said frame members;

means for supporting the tape supply cartridge between said frame members so that the side walls of the tape supply cartridge are generally parallel to said frame members;

means for creating a lettering force against said tape at a printing station comprising a print bar pivotally supported between, and about an axis perpendicular to, said frame members and a force resisting arm for resisting force caused by pivotal movement of said print bar, said force resisting arm being pivotally mounted with respect to one



of said frame members between an operative position in which said arm extends between and is supported by a portion of said frame members for resisting force caused by pivotal movement of said print bar and an inoperative position in which said arm is pivoted away from said operative position to permit the introduction of said tape supply cartridge into said cartridge receiving cavity; and

means for causing limited pivotal movement of said print bar whereby said cartridge receiving cavity and said print bar lie in a generally common plane defined by and disposed between said pair of parallel frame members and said pair of parallel frame members further define said cartridge receiving cavity, provide pivotal support for said print bar and provide support for said force resisting arm.

4,697,941

PLATEN AND PAPER DRIVE IN AN INKED-PLATEN WIRE-DOT IMPACT PRINTER

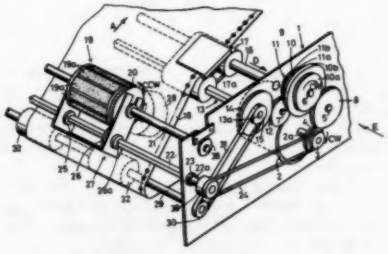
Hideaki Takenoya, Hachioji, and Fumiyuki Mishima, Hino, both of Japan, assignors to Janome Sewing Machine Industry Co., Ltd., Japan

Continuation of Ser. No. 617,783, Jun. 6, 1984, abandoned. This application Apr. 9, 1986, Ser. No. 850,084

Claims priority, application Japan, Jun. 7, 1983, 58-100230; Jun. 8, 1983, 58-86411[U]

Int. Cl.[4] B41J *27/08*

U.S. Cl. 400—185 **2 Claims**



1. A printer having a rotary platen having a plurality of members saturated with different color inks provided on a

periphery thereof, a printing head arranged opposite to said platen so as to cooperate with said platen to apply an ink of a specific color to a printing paper adapted to pass therebetween, first means **22, 26, 20** for rotating said platen, second means **13, 17, 32** for transporting said printing paper relative to said platen and said printing head, said printer comprising a single reversible motor electrically energized to rotate in one and the opposite directions; first transmission means **3, 24, 39** operatively connecting said first means to said single reversible motor irrespective of the rotational direction of the motor; and second transmission means operatively connecting said second means to said single reversible motor, said second transmission means **4, 8, 9, 12, 14, 31, 30** including a one-way clutch, said clutch being operative to transmit the rotation of said single reversible motor to said second means when said motor is rotated in one direction, said clutch remiaining inoperative failing to transmit the rotation of said single reversible motor to said second means when the motor is rotated in the opposite direction, said second transmission means including an intermediate gear **8** provided between said single reversible motor and said one-way clutch, said intermediate gear having gear teeth provided therearound, further comprising a first rotating member operatively connected to said motor and normally rotated in one or the other direction together with said motor, a second rotating member operatively connected to said second means for transporting said printing paper relative to said platen and said printing head and coupling means for operatively connecting said first rotating member to said second rotating member when said motor is rotated in said one direction to thereby transmit the rotation of said motor to said second means, said coupling means disconnecting said first rotation member from said second rotating member when said motor is rotated in said opposite direction, so as to rotate said platen with respect to said printing paper while the latter is kept standstill.

4,697,942

RIBBON SHIFTING DEVICE FOR A PRINTING APPARATUS

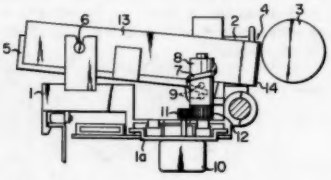
Takashi Yagi; Yoshiharu Horii, and Yasuo Domoto, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Apr. 3, 1986, Ser. No. 847,472

Claims priority, application Japan, Apr. 8, 1985, 60-73782; Apr. 8, 1985, 60-73783

Int. Cl.[4] B41J *32/00, 35/14*

U.S. Cl. 400—208 **5 Claims**



1. A ribbon shifting device for a printing apparatus, comprising:

an ink ribbon having a plurality of color zones;

a multicolor ribbon cassette containing the ink ribbon;

a cassette holder for removably holding the multicolor ribbon cassette;

a carriage holding the cassette holder so that the cassette holder is shiftable widthwise of the ink ribbon;

a cam rotatably supported on the carriage to shift the cassette holder;

driving means provided on the carriage, to drive the cam for rotation in opposite directions;

power transmitting means for transmitting the power of the driving means to the cam, including at least two meshing gears;

one of the two meshing gears having a recess for disengaging the two meshing gears when the cassette holder is located at the home position; and

urging means provided on the carriage, for rotatively urging the cam when the two meshing gears are disengaged so as to engage the two gears.

4,697,943

ELECTRIC PLATEN DRIVING DEVICE WITH MANUAL OVERRIDE

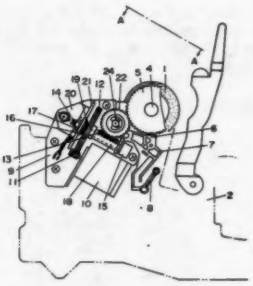
Hiroaki Ookubo, Kurume, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 10, 1985, Ser. No. 753,566

Claims priority, application Japan, Jul. 10, 1984, 59-142727

Int. Cl.[4] B41J *19/92*

U.S. Cl. 400—568 **2 Claims**



1. A device for driving a platen comprising:

a motor for driving a gear train for rotating said platen;

said gear train comprising a worm and worm gear operatively connected between said motor and said platen and rotated by said motor for transmitting drive from said motor through said worm and worm gear to rotate said platen intermittently, said worm having an engaging portion along part of the periphery thereof comprised of at least one worm tooth for engaging and driving said worm gear when said at least one worm tooth is rotated into engagement with said worm gear by said motor and having a non-engaging portion along the remainder of the periphery for disengaging said worm from said worm gear when said at least one worm tooth is rotated out of engagement with said worm gear;

a ratchet operatively connected to said platen for rotating synchronously with said platen and having ratchet teeth;

a detent pawl adjacent said ratchet having resilient means for biasing said detent pawl into engagement with two adjacent ones of said ratchet teeth for accurately and firmly positioning said ratchet and said platen operatively connected thereto when said non-engaging portion of said worm disengages said worm from said worm gear, said ratchet being rotatable in either of two directions when engaged by said detent pawl and when said non-engaging portion of said worm disengages said worm from said worm gear such that said platen operatively connected thereto is also rotatable in either of two directions when said non-engaging portion of said worm disengages said worm from said worm gear; and

control means connected to said motor for stopping said motor during a time period when said at least one worm tooth is rotated out of engagement with said worm gear.

4,697,944

SHEET FEEDING APPARATUS WITH COOPERATING ENDLESS BELTS

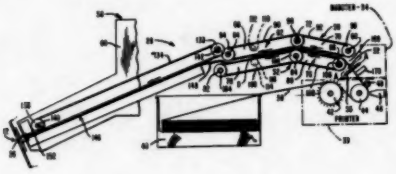
John A. Peebles, and James D. Swinton, both of Dundee, Scotland, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 22, 1986, Ser. No. 945,050

Claims priority, application United Kingdom, Nov. 6, 1986, 8626584

Int. Cl.[4] B65H 5/02; B41J 13/08

U.S. Cl. 400—635 11 Claims



1. A sheet feeding apparatus for feeding sheets one by one from an entry location therein to an exit slot therein, comprising:

a first drive shaft;

a first elongated drive belt assembly arranged to be driven by, and pivotable about the axis of, said first drive shaft which is mounted adjacent one end of said first elongated drive belt assembly;

a second drive shaft;

a second elongated drive belt assembly mounted in cooperative relationship with respect to said first elongated drive belt assembly and arranged to be driven by, and pivotable about the axis of said second drive shaft which is spaced inwardly from both ends of said second elongated drive belt assembly;

each of said first and second elongated drive belt assemblies being pivotally movable between a closed position in which said first and second elongated drive belt assemblies are in cooperative engagement with each other for feeding a sheet therebetween towards said exit slot from said entry location and an open position in which the cooperating surfaces of said first and second elongated drive belt assemblies are spaced apart; and

means for bringing about pivotal movement of said first and second elongated drive belt assemblies between their said closed and open positions.

4,697,945

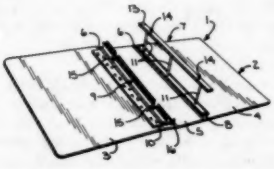
BINDER FOR SHEET MATERIAL

John A. Geiger, Milwaukee, Wis., assignor to Majestic Industries, Inc., Teterboro, N.J.

Continuation-in-part of Ser. No. 673,186, Nov. 19, 1984, abandoned. This application Nov. 8, 1985, Ser. No. 797,743

Int. Cl.[4] B42F 13/00

U.S. Cl. 402—75 16 Claims



1. A method of fabricating a binder for sheet material comprising the steps of forming a non-metallic cover including a front cover section, a rear cover section and a spine connecting said cover sections;

joining each cover section to said spine along a hinge line;

stamping out a plurality of prongs at angles of between 75 degrees and 85 degrees from at least one metal plate of a binding mechanism, each prong having a length at least two times greater than the thickness of the corresponding cover section;

disposing said at least one metal plate flatwise against the respective cover section;

embedding said prongs in the respective cover section and thereby bending them so that they come to rest at substantially smaller angles, said prongs being confined wholly within the thickness of the respective cover section and no portion of said prongs being exposed on the opposite surface of the respective cover section.

5. In a binder construction;

a non-metallic cover having a thickness in the range of 0.100 to 0.152 inch;

at least one metal plate of a binding mechanism disposed flatwise against said cover;

a plurality of prongs generally triangular in shape and having a curved sharpened tip, stamped out at angles of between 75 degrees and 85 degrees from said plate and having a length at least twice as great as the thickness of said cover;

said prongs when embedded in said cover bending and coming to rest at substantially smaller angles with no portion of said prongs being exposed on the opposite surface of said cover.

4,697,946

FURNITURE CONNECTOR

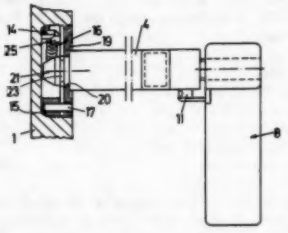
Erich Röck, Höchst, and Helmut Hollenstein, Lustenau, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed Apr. 1, 1986, Ser. No. 846,816

Claims priority, application Austria, Apr. 25, 1985, 1237/85

Int. Cl.[4] F16B 7/08, 21/00

U.S. Cl. 403—9 6 Claims



1. A furniture connector for joining a first furniture part, for example a drawer front plate, to a second furniture part, for example a drawer side wall or rail member, said connector comprising:

a cylindrical housing to be inserted into a bore formed in the first furniture part, said housing having a outer plate with an opening, said opening positioned coaxially centrally of said housing;

a elongated member to be fastened to the second furniture part to extend therefrom, said elongated member having an end portion which is insertable into said opening in a direction axially of said housing, and said elongated member having an annular groove formed on said end portion; and

means mounted within said housing for releasably retaining said end portion of said elongated member within said housing and thereby for releasably connecting the first and second furniture parts, said retaining means comprising an axle mounted eccentrically within said housing, a slide member having first and second ends, said slide

member mounted for pivotal movement about said first end on said axle in a plane transverse to the axis of said housing between a first position, whereat a portion of said slide member extends into said groove in said elongated member and thereby retains said elongated member within said housing, and a second position, whereat said portion of said slide member is withdrawn from said groove such that said elongated member may be withdrawn from said opening, and compression spring means acting between said housing and said second end of said slide member for urging said slide member to said first position thereof.

4,697,947

PLUG CONNECTION FOR BORING TUBES

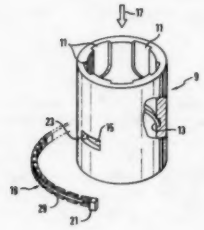
Karlheinz Baue.; Johann Haberer, both of Schrobenhausen, and Maximilian M. Arzberger, Igenhausen, all of Fed. Rep. of Germany, assignors to Karl Bauer Spezialtiefbau GmbH & Co. KG, Schrobenhausen, Fed. Rep. of Germany

Filed May 29, 1986, Ser. No. 868,006

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1985, 3519773

Int. Cl.[4] B25G *3/00*; F16D *1/00*

U.S. Cl. 403—14 **7 Claims**



1. A plug connection for drilling or boring tubes, rods and worms of earth boring equipment or the like, said plug connection comprising

a male part,

a female part,

a radial coupling and an axial coupling defined by said male part and said female part for interconnecting said male part and said female part and for transfer of torque between said male part and said female part, said axial coupling being arranged in an overlap zone defined by said male and female parts,

a locking device for the positive coupling of said male part and said female part, said locking device being introduced from the outside through said female part and into superimposed recesses extending circumferentially as an annulus in both said male and female parts, said locking device is constructed as a multilink chain with interfitted links, said chain extending completely around said annulus and said chain being introduced through said female part into said annulus via a single opening.

4,697,948

PIVOTAL COUPLING DEVICE

Moritoshi Fukuda, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan

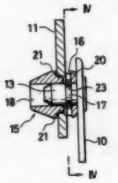
Filed Sep. 3, 1986, Ser. No. 903,393

Claims priority, application Japan, Sep. 9, 1985, 60-136804[U]

Int. Cl.[4] F16B *9/00*

U.S. Cl. 403—71 **1 Claim**

1. A device for pivotally coupling together two members, one of said two members being provided with a pivot support pin having a peripheral annular groove and the other one of said two members having a bearing hole for receiving said pivot support pin therein, said device comprising a cylindrical coupling member fitted on said pivot support pin and a resilient and flexible lock member for releasably locking said coupling member against detachment from said pivot support pin, said coupling member having a lock flange provided at one end and an elastic lock pawl formed on the outer periphery, said lock member being of elongated ring-like shape and having opposite end portions joined by intermediate portions and an inwardly projecting lock portion on at least one of said intermediate portions, said lock member being fitted on said coupling member such that said portions penetrate a window formed in the



peripheral wall of said coupling member so that they project into a bore thereof and are received in said annular groove of said pivot support pin thereby releasably locking said coupling member against detachment from said pivot support pin, said locking member being resiliently deflected upon pressing said opposite end portions together to disengage said locking projection from said groove said coupling member being inserted through said bearing hole formed in said other member and mounted therein with said other member clamped between said elastic lock pawl and said lock flange, said two members being thereby releasably rotatably coupled together.

4,697,949

PLUG, SOCKET AND PLUG-AND-SOCKET COUPLING THEREOF FOR TEMPORARILY ATTACHING AN IMPLEMENT TO A HANDLE

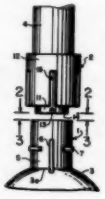
Antonio C. Perez, Barcelona, Spain, assignor to Firma Vileda GmbH, Weinheim, Fed. Rep. of Germany

Filed May 7, 1986, Ser. No. 860,649

Claims priority, application Spain, May 20, 1985, 286841

Int. Cl.[4] F16B *1/04*

U.S. Cl. 403—361 **16 Claims**



1. A plug for a coupling for temporarily attaching a handle to an implement, said plug being adapted to mate with a coaxial socket and comprising:

a cylindric plug body;

an attachment device on one end of the plug body for attaching the plug to one of the handle and implement;

a flange projecting generally radially from the one, attachment-device end of the plug body having an annular surface, which is externally cylindric coaxially with the plug body and substantially normal to the axis of the plug body, for engaging the socket of the coupling;

at least one spring strip projecting from the flange parallel to the axis of the plug body substantially along the length of the plug body and radially spaced from the plug body by

the radial width of the annular, socket-engaging surface of the flange;

at least one latching means on the inside of the spring strip facing the plug body substantially spaced along the spring strip from the flange and extending transversely to the axis of the plug body; and

at least two notches on the spring strip extending axially of the plug body to open ends thereof remote from the flange, the closed end of at least one notch being closer to the flange than the latching means of the plug;

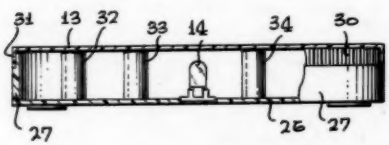
whereby the placement of said at least one notch enables said spring strip to flex in the region of said latching means.

4,697,950

ILLUMINATED STEPPING PAD

Wayne E. Copeland, 2641 Townsgate Rd., Suite 600, Westlake Village, Calif. 91361

Filed Jun. 5, 1986, Ser. No. 871,083
Int. Cl.[4] E01F *9/04*
U.S. Cl. 404—9 **1 Claim**



1. A luminous stepping or foot pad for marking a footpath comprising:

a base means composed of translucent or transparent material having a flat, circular panel engaging a ground surface which supports a continuous upright sidewall terminating in a knurled lip;

a lid or cover having a downwardly depending knurled flange detachably connected to said knurled lip of said base means continuous upright sidewall

said lid or cover and said circular panel having opposing surfaces spaced apart by said sidewall defining a central cavity;

low voltage electrical illumination means strategically located on said circular panel of said base means for projecting light throughout said central cavity;

said lid or cover composed or translucent or transparent material transmitting light therethrough from said central cavity;

load-bearing supports disposed between said lid or cover and said circular panel opposing surfaces for transferring applied loads therebetween comprising a plurality of columns having their opposite ends in load-bearing engagement with said opposing surfaces of said lid or cover and said circular panel;

an irregular surface of non-skid material carried on the exposed exterior surface of said lid or cover;

a decorative display means disposed on selected portions of said lid irregular surface comprising indicia or graphic subject matter visible when said central cavity is illuminated;

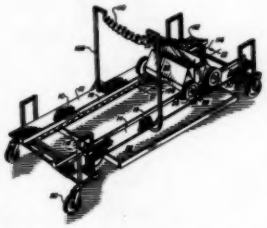
anchor means carried on said circular panel for retaining said base means in position on said ground surface.

4,697,951

MATERIAL SPREADER SYSTEM

J. Dewayne Allen, Paragould, Ark., assignor to Allen Engineering Corporation, Paragould, Ark.

Continuation of Ser. No. 311,674, Oct. 15, 1981, Pat. No. 4,540,312, which is a continuation-in-part of Ser. No. 170,126, Jul. 18, 1980, Pat. No. 4,349,294, which is a continuation-in-part of Ser. No. 101,545, Dec. 10, 1979, abandoned. This application Dec. 6, 1984, Ser. No. 678,706
Int. Cl.[4] E01C *19/18*
U.S. Cl. 404—110 **42 Claims**



1. Apparatus for uniformly spreading loose particulate topping material over a concrete surface area having a length, width and opposing sides, said apparatus comprising:

a. moveable spreader means including a hopper for storing a supply of loose particulate topping material and for dispensing a uniformly wide layer of the topping material from an elongated slot in said hopper as said spreader means is translated along a path;

b. bridge means supported above and spanning the width of the concrete surface area without contacting the concrete surface and translatable along the length of the concrete surface area for providing an elevated path to translate said spreader means across a widthwise segment of the concrete surface area and for maintaining said spreader means vertically spaced above and separated from the concrete surface, said bridge means including a triangular truss span for supporting the weight of said spreader means and having

i. a horizontally oriented upper surface for engaging said spreader means and for supporting the weight of said spreader means, said surface including first and second spaced apart edges;

ii. an apex positioned below and centered about the horizontally oriented upper surface;

iii. a plurality of struts extending between the apex of said span and the first and second edges of said span;

c. means coupled to said spreader means for metering the discharge of topping material from said elongated slot onto the widthwise segment of the concrete surface area at a rate proportional to the translation velocity of said spreader means across said bridge span and independent of the vertical spacing between said slot and the concrete surface;

d. drive means for translating said spreader means back and forth across said bridge span to thereby dispense a uniform layer of topping material over the widthwise segment of the concrete surface area; and

e. drive control means for activating said drive means to control the back and forth translations of said spreader means along said bridge span;

whereby sequential translations of said spreader means across said bridge span followed by sequential translations of said bridge means along the length of the concrete surface area in displacements related to the width of the layer of topping material dispensed by said spreader means covers the entire concrete surface area with a uniform layer of topping material.

4,697,952

UNDERGROUND IRRIGATION APPARATUS AND METHOD FOR USING SAME

Mitchell E. Maddock, 541 West Coolidge Ave., Coolidge, Ariz. 85228

Filed Feb. 28, 1986, Ser. No. 834,544
Int. Cl.[4] E02B *13/00*
U.S. Cl. 405—43 16 Claims

1. Underground irrigation apparatus comprising in combination: ground penetrating means having a first end, a second end, and an elongated tubular body portion extending therebetween, said body portion having a central passageway defined therethrough having an ingress therein adjacent said first end and an egress therefrom adjacent said second end, hose coupling means operatively associated with said ingress in communicative relationship with said passageway and said egress to provide a fluid assist to said means when penetrating ground, said ground penetrating means adapted to form a hole in ground for which irrigation is desired; and distribution means having an elongated hollow body member having a first end and a second end and extending therebetween, said body member having a first and second opening disposed one at each end thereof, said body member having an upper impervious portion and a lower foraminous portion, said impervious portion being adapted to deliver fluid without loss from said first opening to said foraminous portion, said foraminous portion being adapted to deliver said fluid from said impervious portion in lateral and axial directions for delivery into the ground surrounding said body member.

4,697,953

METHOD AND APPARATUS FOR SUBSEQUENT UNDERGROUND SEALING

Manfred Nussbaumer, Leonberg; Eberhard Gläser, Aichwald; Eberhard Beitinger, Stuttgart, and Hartmann Eckardt, Leutenbach-Weiler, all of Fed. Rep. of Germany, assignors to Ed. Züblin Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

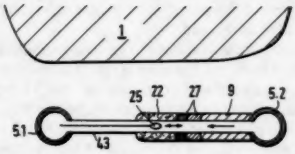
Filed Feb. 28, 1985, Ser. No. 706,661
Claims priority, application Fed. Rep. of Germany, Feb. 29, 1984, 3407382
Int. Cl.[4] B09B *1/00;* E02D *5/18*
U.S. Cl. 405—128 33 Claims

1. A method for subsequently producing an underground seal for an area, including the step of inserting sealing material to form a horizontal water impermeable barrier into the ground externally of and below said area which is to be sealed; the improvement therewith which includes the steps of:

installing working pipes in a region below and externally of said area which is to be sealed;

introducing sealing material into earth between adjacent ones of said working pipes, said sealing material hardening for forming said water impermeable barrier;

introducing said sealing material in at least one jet, which is movable in a horizontal plane; providing connecting pipes for connecting said work pipes, and



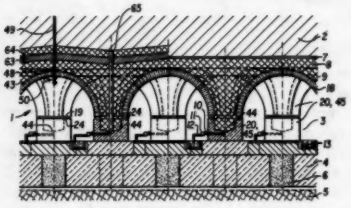
introducing the sealing material to form a complete horizontal water-impermeable barrier by breaking through the walls of said connecting pipes with said at least one jet movable in the horizontal plane.

4,697,954

BASEMENTED FLOOR STRUCTURE FOR A WASTE DUMP

Karl Grund, Nachtigallenweg 5, D-6238 Hofheim/Ts., Fed. Rep. of Germany

Filed Dec. 11, 1985, Ser. No. 807,589
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1984, 3445127
Int. Cl.[4] B09B *1/00*
U.S. Cl. 405—128 14 Claims



1. In a waste dump which has foundations, a subgrade, a purifying plant, a water removal system, and a waste body that produces seepage,

layers of sealing material positioned under said waste material,

drainage material positioned over said sealing material,

means connecting said drainage material with said water removal system,

a basemented floor structure positioned under said drainage material, said basement floor structure characterized in that the basemented floor structure (**1**) includes a plurality of piers (**20, 25, 30, 35, 40**), said piers having collecting zones (**44**) for the seepage,

a plurality of individual support elements (**18, 23, 28, 33, 38**) each of which have feet, said individual support elements being upwardly convex or concave, separated from one another by seams (**51, 60, 61**), the upper surface (**43**) of the support elements being inclined toward said feet (**19, 24, 29, 34, 39**), said feet resting on said piers,

whereby the burden of the waste body is transferred to said support elements, then to said piers and then onto said foundations and from there to said subgrade and, means connecting said collecting zones to said purifying plant.

4,697,955

METHOD OF CONSTRUCTING REINFORCED CONCRETE WORKS SUCH AS UNDERGROUND GALLERIES, ROAD TUNNELS, ET CETERA; PRE-FABRICATED CONTRETE ELEMENTS FOR CONSTRUCTING SUCH WORKS

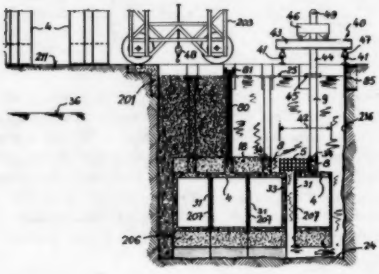
Pierre A. L. M. G. Le Clerco, Av.des Ormeaux 22, B 1180 Brusselles; Jean C. Delheusy, Av.deMalmaison 17, B 1410 Waterloo, and Guy J. Rigot, Lambert Etienne 38, B-5300 Ciney, all of Belgium

Filed Jul. 29, 1983, Ser. No. 518,752

Claims priority, application Belgium, Jul. 30, 1982, 0/208718; Oct. 8, 1982, 0/209205; Mar. 4, 1983, 0/210157

Int. Cl.[4] E21D *10/04*

U.S. Cl. 405—135 8 Claims



1. A method of constructing reinforced concrete works, such as tunnels, underground galleries for underground railways, and the like, comprising: excavating an open trench, placing in said trench consecutively and contiguously preframes constituted of prefabricated hollow concrete blocks while leaving joints therebetween, said concrete blocks having walls to be completed with additional concrete up to a desired thickness once said blocks are positioned in said trench, said walls having concrete retaining and reinforcing means for said additional concrete, and means on said walls of each preframe which define said desired thickness and which also define with corresponding means of an adjacent one of said contiguously placed preframes a recess, pouring into said recess said additional concrete to thus cover said joints left between said contiguously placed preframes and form a monolithic work, and filling the remaining space of the trench with a filling material.

4,697,956

PIVOTAL BUMPER ATTACHMENT

Teddy J. Plaisance, R. R. 1, Box 243, Golden Meadow, La. 70357

Filed Jul. 1, 1985, Ser. No. 750,920

Int. Cl.[4] E02B *3/22;* B63B *59/02*

U.S. Cl. 405—213 13 Claims

1. A bumper for attachment to a leg of an off shore platform, comprising:

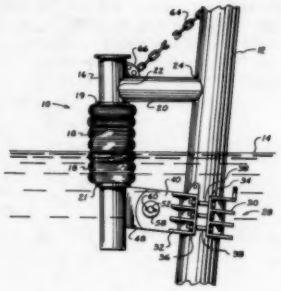
an upright element which carries resilient bumper means;

a first arm projecting outwardly from the upright element for attachment to a leg of the platform above a water line; and

a second arm projecting outwardly from the upright element and means for pivotally connecting the second arm to the leg below the water line to facilitate vertical alignment of the upright element, said means for pivotally connecting the second arm to the leg below the water line comprising:

a brace fixed to the leg, the brace comprising:

a projection which defines a pivot axis below the water line; and



a pivotal joint between the second arm and the projection at the pivot axis.

4,697,957

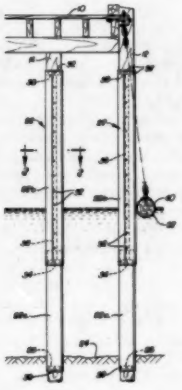
MARINE PILE PROTECTIVE SYSTEM

Emil D. Hellmers, 81 Rivo Alto Canal, Long Beach, Calif. 90803

Continuation of Ser. No. 929,104, Jul. 31, 1978, abandoned. This application Oct. 18, 1979, Ser. No. 86,059

Int. Cl.[4] E02D *5/60*

U.S. Cl. 405—216 1 Claim



1. The combination of a marine log and a single layer protective covering therefor comprising:

(a) a sheath made as an extruded tube of semi-rigid ultra-high density hexene-ethylene copolymer having characteristics of high tensile strength, resilience and toughness sufficient to withstand mechanical impact and abrasion;

(b) said sheath having a nominal diameter prior to installation that exceeds the diameter of the marine log, and having a wall thickness of at least about 0.16 inches;

(c) said sheath being longitudinally split with edges overlapped with at least one side of the split being bevelled to cam the edges out of abutting relationship and into overlapped relationship upon the imposition of a closing circumferential force; and

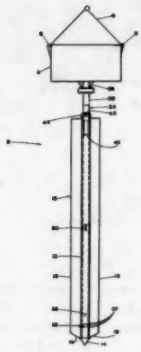
(d) fasteners engaging along said overlapped edges and holding said edges overlapped and said sheath in place to provide a space for trapping water between the log and the sheath, the space between the sheath and the log being otherwise free.

4,697,958

EMBEDMENT ANCHOR

Patrick M. Kenny Sr., Belle Chasse, La., assignor to Ben-Jac, Inc., Belle Chasse, La.

Continuation-in-part of Ser. No. 574,871, Jan. 30, 1984, Pat. No. 4,619,218. This application Aug. 8, 1985, Ser. No. 763,951
The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.
Int. Cl.[4] E02D *5/74*; B63B *21/28*
U.S. Cl. 405—228 3 Claims



1. An embedment anchor assembly for anchoring to a sea floor, comprising:

a. an inertia load drive member;

b. a substantially elongated drive tube assembly extending vertically downward from said inertia load drive member;

c. a substantially elongated anchor shaft means mounted coaxially around said drive tube assembly;

d. an anchor fin means attached to the anchor shaft means and adapted to provide a substantially low resistance to penetration within the sea floor and providing a substantially high resistance to sideways displacement forces;

e. a low velocity burning jet means positioned within the drive tube assembly;

f. an electrical detonation means for detonating the low velocity burning jet means mounted within the drive tube assembly;

g. vertical position sensing means adapted to prevent detonation of the low velocity burning jet means if the position of the anchor shaft means is away from vertical;

h. means for attaching an anchor rode means to the anchor shaft means; and

i. a shear bolt assembly adapted to provide for releasable attachment of the anchor shaft means to the drive tube assembly adjacent their respective upper portions.

4,697,959

METHOD AND APPARATUS FOR INSTALLING AN IN-GROUND SUPPORT FOOTING AROUND AN UPSTANDING ELONGATE OBJECT

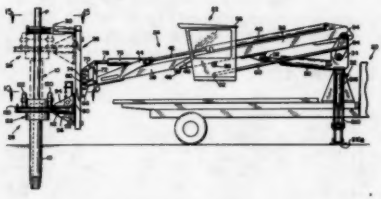
Frank R. Kinnan, Camas Valley, Oreg., assignor to Utilitech, Incorporated, Walnut Creek, Calif.

PCT No. PCT/US83/01878, § 371 Date Aug. 1, 1985, § 102(e) Date Aug. 1, 1985, PCT Pub. No. WO85/02435, PCT Pub. Date Jun. 6, 1985
PCT Filed Dec. 1, 1983, Ser. No. 763,145
Int. Cl.[4] E02D *37/00*
U.S. Cl. 405—232 40 Claims

1. An assembly for installing an in-ground support footing around subterranean and above-ground portions of an upstanding elongate object, such as a structural pole, post or the like, to enhance structural integrity thereof, comprising:

cylindrical casing means of hollow construction having a cutting means concentrically positionable around a lower, above-ground region of the elongate object so that the cutting means engages the ground; and

driver means positionable about a circumferential portion of the casing means operable for engaging the casing means and rotating it about its longitudinal axis while simultaneously imparting a downwardly-directed force against the upper edge of the casing means thereby to drive the



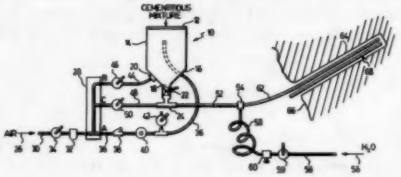
casing means into the ground to a predetermined depth, wherein the driver means includes first and second drive sections movable relative to one another from an inoperative first, open position for receiving the casing means therebetween to a second, closed position surrounding a circumferential portion of the casing means, thereby establishing an operative drive mode for rotating the casing means and directing it downwardly into the ground.

4,697,960

METHOD AND APPARATUS FOR ANCHORING ROCK BOLTS AND CABLES

Elmer M. Pelto, and Allan Pearson, both of Kimberley, Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed May 31, 1985, Ser. No. 739,651
Int. Cl.[4] E21D *20/02*
U.S. Cl. 405—260 12 Claims



1. A method for permanently installing anchor cables and rock bolts in drill holes, which method comprises conducting a dry mix of an aggregate mixture and cement under pressure to a water fitting, wetting said dry mix at said water fitting with a limited, predetermined quantity of water, to provide a wetted dry mix, said quantity of water being sufficient to permit the hardening of said wetted dry mix but insufficient to allow said wetted dry mix to flow from a drill hole, passing said wetted dry mix from said water fitting under pressure through a delivery means, blowing substantially uniformly wetted dry mix from said delivery means into a drill hole having a space defined by the wall of the drill hole and containing an anchor cable or rock bolt so that the wetted dry mix fills the space between the anchor cable or rock bolt and the wall of the drill hole, and withdrawing the delivery means while filling said space.

4,697,961

PROCESS FOR CONSOLIDATING SOILS

Marcel F. L. P. De Boodt; Eric B. A. De Strooper, and Marc R. Van Meirvenne, all of Gent, Belgium, assignors to Labofina, S.A., Brussels, Belgium

Filed Feb. 5, 1986, Ser. No. 826,438

Claims priority, application United Kingdom, Feb. 11, 1985, 8503479

Int. Cl.[4] C09K *17/00;* E02D *3/12*

U.S. Cl. 405—264 10 Claims

1. A process for consolidating soils which process comprises intimately contacting the soil to be solidified with:

(a) a cement in an amount of from about 5 to about 15 parts by weight per 100 parts by weight of dry soil;

(b) an alkali metal silicate in an amount, on anhydrous basis, of from about 1.5 to about 5 parts by weight per 100 parts by weight of dry soil;

(c) a dialdehyde having the general formula O=CH—(R-)$_n$—CH=O, wherein R is a divalent aliphatic radical having 1 to 8 carbon atoms and n is 0 or 1, in an amount, on anhydrous basis, of 0.1 to 5 parts by weight per 100 parts by weight of dry soil.

4,697,962

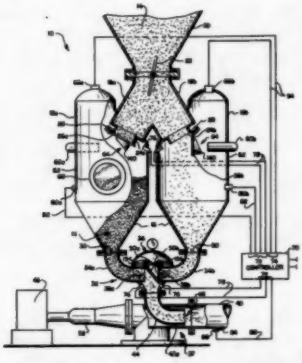
CONTROL SYSTEM FOR A CONTINUOUS PROCESS VENTURI ACCELERATED PNEUMATIC PUMP

Richard M. Dunbar, Oakdale, Minn.; Charles E. Wynosky, Minersville, Pa., and Henry E. Stoiber, Lakeland, Fla., assignors to Coalair Systems Limited Partnership, New York, N.Y.

Filed Aug. 2, 1985, Ser. No. 761,970

Int. Cl.[4] B65G *57/66*

U.S. Cl. 406—15 23 Claims



1. An apparatus for feeding product under steady-state conditions into a pipeline for pneumatic conveyance by carrier gas flowing through the pipeline at a predetermined pressure, comprising first and second upright tanks in combination with a venturi assembly adapted to introduce product into a pressurized pipeline for pneumatic conveyance, said tanks being arranged to separately hold a quantity of the product, each tank having an associated upper opening for receiving product through a supply means from a supply thereof and an associated lower opening for feeding product from the tank into said venturi assembly during a discharge period, means for selectively opening and closing said upper and lower openings, said upper openings being normally open and said lower openings being normally closed, means for selectively pressurizing each tank to a pressure above the pipeline pressure when said associated upper opening is closed to cause the product to flow from the tank into the venturi assembly through said associated lower opening, means for sensing a predetermined fill level of the product in each tank, means associated with each tank for detecting whether said upper and lower openings are closed, and control means for automatically regulating feed of the product into the venturi assembly in response to indications received from said sensing and detecting means to provide controlled continuous duty operation of said apparatus by verifying proper and alternate product flow into and out of said tanks wherein one tank is discharging product into the venturi assembly as the other tank is filling with product, said control means verifying prior discharge of product from said other tank to be filled by monitoring said sensing means, if discharge is not verified, said control means deactivating said supply means and activating said pressurizing means to temporarily pressurize said other tank to effect discharge thereof; if discharge is verified, said control means then activating said pressurizing means to pressurize said one tank to be discharged when said sensing means indicates said one tank is filled and said detecting means indicates said associated lower opening is closed.

4,697,963

INSERT CLAMPING DEVICE AND INSERT THEREFOR

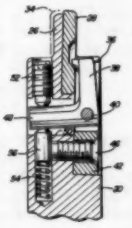
Edwin Lück, Mudersbach, Fed. Rep. of Germany, assignor to Ingersoll Cutting Tool Company, Rockford, Ill.

Filed Jan. 27, 1986, Ser. No. 822,738

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1985, 8503545[U]; Jun. 4, 1985, 8527924[U]

Int. Cl.[4] B23C *5/22*

U.S. Cl. 407—105 18 Claims



1. In a slot milling cutter having a flat circular body with a central peripheral ridge narrower than the slot to be milled, and pockets on the sides of said ridge and cutter body to receive replaceable on-edge cutting inserts protruding from said pockets radially and axially of said ridge, said cutter body being adapted to be ganged with multiple such cutters in facing contact on a common rotational axis for the simultaneous milling of multiple slots in a workpiece,

a clamping mechanism for each such insert pocket comprising a detent in the form of an arm extending generally radially within a recess in the body of the cutter and having thereon a protrusion insertable into a depression formed in the outer axially facing surface of an insert seated in said pocket,

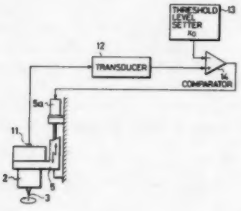
an adjusting screw extending generally radially into the cutter body on the side of said ridge opposite the detent arm, and

means in the path of said screw connected to said detent arm and operable by the engagement of said screw therewith when the screw is advanced into the cutter body to move said detent arm axially of the cutter body into clamping engagement with an insert in the associated pocket.

4,697,964
BORING MACHINE

Yoichi Daiko, Sagamihara; Masami Masuda, and Takao Terabayashi, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 23, 1985, Ser. No. 758,033
Claims priority, application Japan, Jul. 24, 1984, 59-152063
Int. Cl.[4] B23B *39/00*
U.S. Cl. 408—6 13 Claims

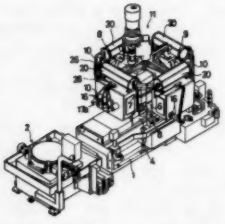


1. A boring machine capable of detecting and controlling thrust force to obtain a high quality bore having a drill, a spindle housing, a spindle holding said drill and supported rotatably in said spindle housing, a driving means for rotating said spindle, a spindle transfer mechanism provided with a transfer means supporting said spindle housing so that said spindle housing can be transferred, and a non-contacting displacement gauge means for detecting the axial displacement of said spindle in rotary motion relative to the spindle housing to provide a proportional measurement of thrust force in the spindle, a means for setting a threshold level of the axial displacement, a means for comparing the axial displacement of the spindle relative to the spindle housing obtained by said gauge means with said threshold level of the axial displacement, and a control means for carrying out a feedback operation when the level of said actual axial displacement is higher than said threshold level to maintain the thrust force in the spindle at a predetermined level.

4,697,965
APPARATUS FOR PREVENTING INVASION OF CUTTING LIQUID IN REPLACEABLE HEAD TYPE MACHINE TOOL

Jinsei Ida, Sayama; Yoshio Hagimoto, Niiza, and Makoto Ishikawa, Kamifukuoka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 12, 1986, Ser. No. 839,006
Claims priority, application Japan, Apr. 18, 1985, 60-81341
Int. Cl.[4] B23B *51/06*
U.S. Cl. 408—56 2 Claims

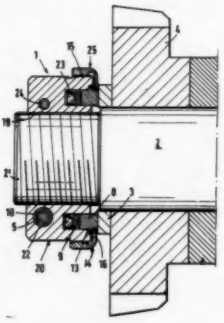


1. In a replacable head type machine tool including a driving unit which is movable to advance and retreat in relation to a workpiece set table so that, by an advance movement of the driving unit, a working head selected to be at a front position of the driving unit may be coupled therewith and be further advanced thereby towards the set table, and a workpiece set on the set table may be applied with a predetermined work by a tool on a forward end of a tool spindle provided on the working head, an apparatus for preventing invasion of cutting liquid characterized in that an accumulator tank is mounted on the head for a pressure fluid which is connected, by piping, to such a spindle housing on the head that inserts and supports the spindle so that a pressure fluid discharged from the tank may be jetted forwards, through the interior of the housing, from an insertion gap around the spindle on a forward end of the housing; and the driving unit is provided with a supply opening connected to a pressure fluid source, and the working head is provided with a connecting opening arranged to be connected to the supply opening at the time of the coupling thereof with the driving unit, the connecting opening being connected, by piping, to the accumulator tank so that a pressure fluid discharged from the pressure fluid source flows through the supply opening and the connecting opening into the tank when the working head is coupled to the driving unit.

4,697,966
PRESSURIZED CLAMP FOR SECURING TOOLS OR WORKPIECES

Manfred Baur, Ulm-Jungingen, Fed. Rep. of Germany, assignor to Albert Schrem Werkzeugfabrik GmbH, Giengen, Fed. Rep. of Germany

Filed Jun. 14, 1985, Ser. No. 745,314
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1984, 3422000
Int. Cl.[4] B23F *23/12*
U.S. Cl. 409—232 6 Claims



1. A pressurized clamp having a longitudinal axis for securing tools or workpieces; said clamp having a front end and having a floating circular piston which is mounted at the front end for exerting pressure against said tool or workpiece to effect the securing thereof; said floating circular piston being adjustable axially toward said tool or workpiece by means of a pressurized fluid; the improvement in combination therewith which comprises:

circular spring means for adjustably spring-loading said floating circular psiton biased symmetrically relative to the longitudinal axis of the clamp in a direction away from said tool or workpeice for automatically and uniformly moving said floating circular piston away from said tool or workpiece when hydrostactic pressure exerted by said pressurized fluid is released to effect return of said floating circular piston so that complicated and bothersome manipulations as to the return of said floating circular piston are avoided;

said piston being provided with contact means for said circular spring means; and

said circular spring means comprises at least one reset spring which acts against said contact means of said piston to

spring-load the latter in the direction away from said tool or workpiece;

said contact means being an annular bead which is formed on the outer periphery of said piston and provides a radial contact surface for said at least one reset spring.

4,697,967

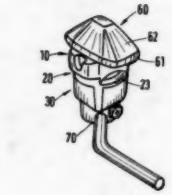
CONTAINER LOCK

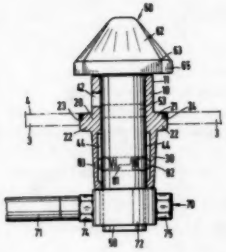
Gerd Schulz, and Hans-Peter Hartleif, both of Hamburg, Fed. Rep. of Germany, assignors to Gerd Schulz Fahrzeug- und Container- Technik, Fed. Rep. of Germany

Filed Jun. 4, 1985, Ser. No. 741,287

Int. Cl.[4] B63B *25/00*

U.S. Cl. 410—82 **8 Claims**





1. A twistlock type container lock, said lock comprising

a housing having an essentially cylindrical vertical bore therethrough, said housing having an upper guide section whose silhousette and axial height are designed for engaging at opening in a container corner bracket, said guide section being defined by two vertical side faces and two vertical end faces, said end faces being perpendicular to the side faces and having a lesser horizontal width than the end faces, and said housing having a mounting section of circular cross-section positioned underneath said guide section, said mounting section extending substantially beyond said guide section at the side faces while at the end faces said guide section extends beyond said mounting section, said mounting section being adapted to be received in a circular throughbore of a support plate of a vehicle component to interconnect said housing with said support plate, said guide section resting on said support plate, said mounting section being turnable within said throughbore to orient said housing in a desired final position after being received therein but prior to being fixed in that final position to the support plate;

two opposite bevels defining at least a portion of the upper annular edge of said mounting section, said bevels being positioned on said mounting section below the side faces of said guide section, said bevels extended downwardly from a top surface of said mounting permitting said mounting section to be bonded to said support plate by a weld so that the top surface of said mounting section and said weld are flush with the top surface of said support plate,

a lock bolt received in said bore, said lock bolt being essentially non-displaceable in its axial direction, but turnable around its axis, said lock bolt having a hammerhead on the upper end thereof, said lock bolt having a handle at the bottom end thereof for twisting said hammerhead between a locking position and a release position, and said lock bolt's hammerhead being supported on its undersurface by the top edge of said housing's upper guide section, and

a releaseable locking element cooperable with said lock bolt for releasably securing said bolt in its locking position.

4,697,968

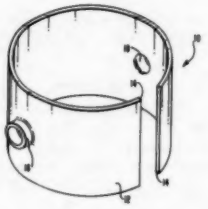
LOCKING RING

Luciano Veronesi, O'Hara, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 27, 1981, Ser. No. 238,789

Int. Cl.[4] F16B *39/28, 39/34*

U.S. Cl. 411—113 **1 Claim**



1. A fastener for securing a plurality of members together comprising:

a first member having a first bore therethrough and having a plurality of notches on the inside surface of said first bore;

a second member having a threaded bore therein and disposed adjacent to said first member;

a substantially cylindrical relatively thin walled ring having a slot therein extending the entire width of said ring for providing flexibility to said ring and having at least two cylindrical protrusions formed approximately midway along the outside width of said ring with said protrusions capable of being disposed in said notches when said ring is disposed in said first bore for preventing rotation of said ring relative to said first member and with said protrusions defining an included angle therebetween of approximately 168° when said ring is in a relaxed state and an included angle therebetween of approximately 180° when said ring is in a compressed state; and

a threaded fastener capable of being disposed through said first bore and engaged to said threaded bore for holding said members together, said threaded fastener having a groove therein for allowing said ring to be crimped into said groove thereby locking said threaded fastener to said ring with said ring thereby preventing movement of said threaded fastener with respect to said members.

4,697,969

WOOD SCREW

Wilford S. Sparkes, 5543-A Marshwood La., Murray, Utah 84107

Filed Sep. 6, 1985, Ser. No. 773,112

Int. Cl.[4] F16B *25/00*

U.S. Cl. 411—387 **10 Claims**

1. An improved wood screw of the type having a head, a shank, a root, a point and threads spiralled about the root, said screw having exceptionally easy starting and insertion of the screw in wood wherein the improvement comprises:

a first spiral flute beginning at the point of the screw and passing essentially the full length of the screw; and

a second spiral flute beginning at the point of the screw and

terminating a short distance from the tip and having about the same shape at the point as the first spiral flute so that the tip is symmetrical about a bisector whereby the tip of

the flute acts as a drill point retaining partial threads, and the first spiral flute carries wood dust out of the hole which is drilled by the turning of the screw.

4,697,970

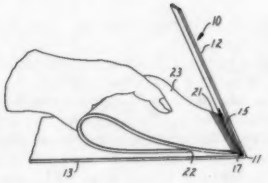
COVER FOR BINDING SHEETS

Gary R. Hanson, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 19, 1986, Ser. No. 864,531

Int. Cl.[4] B42C *11/00*; B42D *3/00*

U.S. Cl. 412—4 **14 Claims**



1. A method of binding loose pages of paper of known length, width and thickness comprising the steps of

selecting a cover having a size corresponding to the size of the papers to be bound, and a strip of pressure-sensitive adhesive on the back portion of the cover and positioned along a fold score line defining an edge of said back portion,

removing a release liner from the adhesive strip,

jogging the loose pages to be bound against a flat surface along the front left longitudinal edge,

clamping the pages together along the opposite longitudinal edge,

rolling the sheets upon themselves, causing the unclamped longitudinal edge to become shingled,

placing the pages inside of the cover up to the fold score line, and

pressing the adhesive strip into contact with the shingled edges of the folded pages.

4,697,971

PERFECT BINDER

Hans Muller, Zofingen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

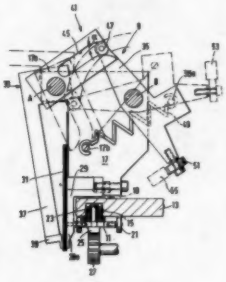
Filed Apr. 15, 1986, Ser. No. 852,298

Claims priority, application Switzerland, Apr. 18, 1985, 01677/85

Int. Cl.[4] B42B *5/00*

U.S. Cl. 412—33 **16 Claims**

1. A bookbinding machine comprising a support defining an endless track which is disposed in a predetermined plane; a series of tongs each including a frame provided with follower means arranged to travel along said track and first and second jaws mounted on the frame and having book-engaging portions, each frame having a pivot member defining a predetermined axis which is substantially parallel to said plane and at least the first jaw of each of said tongs being mounted in the respective frame for pivotal movement of its book-engaging portion about the respective axis toward and away from the book-engaging portion of the respective second jaw; and means for moving said first jaws relative to the respective second jaws, including a lever mounted on each of said frames for pivotal movement about a second axis which is substantially parallel to the respective predetermined axis and ar-



ranged to move the respective first jaw, resilient means for biasing the levers to first positions in which the book-engaging portions of the respective jaws cooperate to clamp a book between them and second positions in which the book-engaging portions of the respective jaws are inoperative, means interposed between said levers and the respective first jaws for magnifying the force with which said biasing means act upon the respective first jaws through the medium of the corresponding levers, first pivoting means for pivoting the levers on the frames of successive tongs of said series toward the first positions during travel along a first portion of said track, and second pivoting means for pivoting the levers to said second positions during travel of the respective tongs along a second portion of said track.

4,697,972

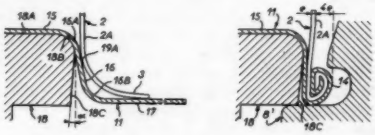
METHOD FOR SEAMING END CLOSURES TO A CONTAINER BODY

Lucien F. Le Bret, Saint-Gratien, and Robert Saada, Maisons-Alfort, both of France, assignors to Gallay S.A., Paris, France

Filed Oct. 7, 1985, Ser. No. 785,382

Int. Cl.[4] B21D *51/32*

U.S. Cl. 413—6 **17 Claims**



1. A method of assembling an end closure to a container body by seaming flanges of the end closure and container body together, comprising the steps of:

providing a preformed end closure having a recessed transverse central portion, a skirt axially and radially extending away from the central portion, and a flange radially outwardly extending from the skirt, and a preformed container body having a sidewall and flange radially outwardly extending from the container body sidewall;

providing a rotatable chuck having an end and circumferential sidewall, and radially displaceable seaming tool;

positioning the end closure on the chuck end in driving engagement therewith, the end closure skirt being circumferentially radially spaced from the chuck sidewall;

nesting the container body relative to the end closure into centered engagement therewith with their flanges in mutual engagement; and

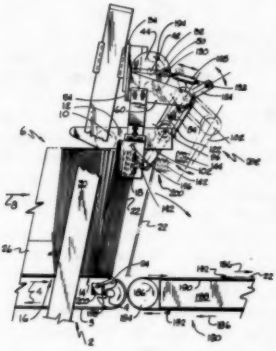
displacing the seaming tool radially inwardly while rotating said chuck to roll the flanges into a seam while deforming the skirt of the end closure against the chuck sidewall thereby reducing the radial projection of the resulting seam relative to the container body sidewall.

4,697,973

APPARATUS AND METHOD FOR HANDLING FOLDED CARTONS

Roger A. Hahn, Arvada, and Henry H. Heins, Golden, both of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Jan. 21, 1986, Ser. No. 820,063
Int. Cl.[4] B65B *41/06*; B65H *3/08*
U.S. Cl. 414—330 **8 Claims**



1. Apparatus for handling folded cartons comprising:

conveyor means having an upper portion extending between a first end portion and a second end portion;

mounting means for holding a plurality of folded cartons having lower, upper and opposite side edges and front and rear surfaces on said upper portion with said lower edge of each folded carton in contact with said upper portion and with said front and rear surfaces of adjacent folded cartons in an abutting contacting relationship;

moving means for moving said folded cartons in one direction from said first end portion toward said second end portion;

retaining means for releasably retaining a first one of said folded cartons at a desired location so that said first one has an exposed front surface;

a processing conveyor means having an upper portion and an end portion adjacent to but spaced from said second end portion;

moving means for continuously moving said upper portion of said processing conveyor means;

a vacuum unit having at least one device having a surface for contacting said exposed front surface of said first one;

moving means for moving said vacuum unit toward said folded cartons and into contact with said exposed surface of said first one and for moving said vacuum unit and said first one away from the remaining folded cartons;

vacuum forming means for forming a vacuum in said vacuum unit when said vacuum unit is in contact with said exposed front surface of said first one so that said first one will move with said vacuum unit as said vacuum unit moves away from said folded cartons and to discontinue said vacuum in said vacuum unit after said first one has been separated from said remaining folded cartons;

force applying means for imparting movement to said first one, after said vacuum has been discontinued, in a direction so that said separated first one is deposited on said upper portion of said processing conveyor means;

said movement of said vacuum unit toward and away from said folded cartons is through an arcuate path;

said means for moving said vacuum unit comprises a parallel motion mechanism;

means for moving said parallel motion mechanism in either a clockwise or counter-clockwise direction;

said parallel motion mechanism and said means for moving said parallel motion mechanism in either a clockwise or counter-clockwise direction comprises:

a rotor mounted for rotation about a fixed axis;

means for rotating said rotor;

a lever having one free end and means mounting the other end of said lever for rotation about a fixed shaft;

a rod rotatably mounted at one end to said free end of said lever and at the other end to said rotor so that said rod moves said lever in a clockwise direction during rotation of said rotor through one-half of a revolution and in a counter-clockwise direction through the other half of said revolution;

an arm secured at one end to said means mounting said lever for rotation with said lever and at its other end fixed to a shaft for movement with said arm;

support means connected at one end to said vacuum unit and at its other end rotatably mounted on said shaft of said arm; and

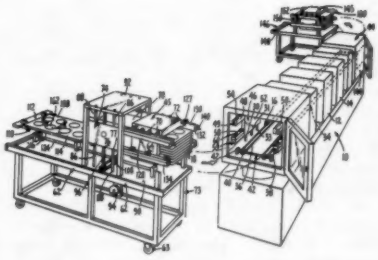
means for rotating said support means through the same number of degrees that said arm and said lever are rotated but in an opposite direction.

4,697,974

PALLET-LOADING SYSTEM

Atef Eltoukhy, San Jose, Calif., assignor to Trimedia Corporation, Fremont, Calif.

Filed Jan. 24, 1986, Ser. No. 821,989
Int. Cl.[4] B65G *67/02*
U.S. Cl. 414—331 **7 Claims**



1. A rapid-load system for loading a series of trays into a plating apparatus of the type having a load-in chamber for receiving a plurality of vertically stacked pallets and a conveyor for successively engaging each of the stacked pallets in the load-in chamber and carrying the engaged pallets through a plating region where one or more substrates supported on the tray are plated under vacuum conditions, said system comprising:

a load-in magazine having a plurality of vertically spaced pallet supports, where each support includes a pair of confronting, inwardly projecting support surfaces on the opposite side walls of the magazine, for engaging opposite side edges of a pallet, and the space immediately above

each support is sufficient to allow insertion of a pallet into the magazine directly above the support, without contact between the tray and the associated support,

structure within the load-in chamber of the plating apparatus, for removably supporting said magazine, and

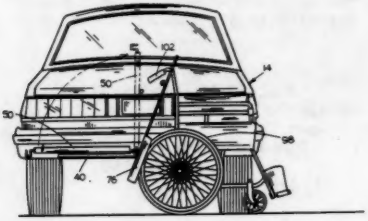
a movable loading cart having (a) a shiftable carriage adapted to move a pallet supported on the carriage between loading and stacking positions, (b) means for supporting the magazine on the cart, (c) means for shifting the supporting means vertically with respect to said shiftable carriage, to place said magazine, when supported on the support means, at each of a series of the insertion positions where a pallet supported on the carriage can be received in the space immediately above a selected pallet support, without contact between the tray and the magazine, as the carriage is shifted from its loading to its stacking positions, and a corresponding release positions, where the inserted pallet is lowered with respect to the magazine, to transfer support of the pallet from the carriage to that support, and (d) transfer means for transferring the magazine from the supporting means on the cart to the structure within the load-in chamber of the plating apparatus, with the cart positioned adjacent such load-in chamber.

4,697,975

WHEELCHAIR CARRIER

Duane Lippold, 827 S. 121st St., Omaha, Nebr. 68154

Filed Feb. 18, 1986, Ser. No. 830,019
Int. Cl.[4] B60R *9/06*
U.S. Cl. 414—462 **5 Claims**



1. In combination,

a vehicle having a rearwardly extending hitch means at the rearward end thereof,

a carrier mounted on said hitch means for supporting and carrying a wheelchair thereon,

said carrier comprising:

(1) a support means secured to said hitch means and extending horizontally rearwardly therefrom;

(2) a generally rectangular platform means, including first and second ends, selectively pivotally mounted on said support means and being pivotally movable from a horizontal carrying position to an inclined loading and unloading position, the longitudinal axis of said platform means being disposed transversely with respect to the central front-to-rear axis of the vehicle, the pivotal axis of connection between said platform means and said support means being transverse with respect to the longitudinal axis of said platform means, said pivotal axis being positioned between the center and said first end of said platform means whereby said platform means may be rotated more than 90° from said horizontal position to said inclined position so that said second end of said platform means will be positioned at a height below the handles of the wheelchair to be carried,

(3) means on said second end of said platform means for engagement with the handles of the wheelchair to be carried for loading the wheelchair onto said carrier and for maintaining the wheelchair on said carrier,

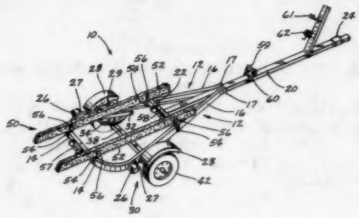
(4) means for maintaining said platform means in said horizontal position.

4,697,976

BOAT TRAILER

Byron L. Godbersen, Lake LaJune Estates, Ida Grove, Iowa 51445

Filed Oct. 4, 1982, Ser. No. 432,770
Int. Cl.[4] B60P *3/10*
U.S. Cl. 414—559 **3 Claims**



1. A boat trailer comprising:

a triangular frame including a pair of identical, integrally formed frame sections, each frame sections including a front portion aligned with a rear portion, and a side portion intermediate said front and rear portions, said front and rear portions lying along the longitudinal axes of the frame, the side portion diverging rearwardly outwardly from the front portion and then curving inwardly to the rear portion, the pair of rear portions aligned and disposed normal to the frame longitudinal axis;

means for releasably connecting said rear portions;

means for releasably connecting said front portions;

a hitch attached to the forward end of said frame for attachment to a prime mover;

ground wheels attached to and supporting said frame;

means for supporting a boat on said frame including a pair of elongated bunks, each bunk resting at a forward end on a frame section and at a rearward end on the same frame section whereby a single frame section supports a bunk at two locations thereon; and

means for loading and launching a boat onto and off of the trailer.

4,697,977

SAFETY BRAKE FOR VERTICAL LIFT

Weston R. Loomer, Florence, and Randall P. Coons, Crescent Springs, both of Ky., assignors to Litton Systems, Inc.

Continuation of Ser. No. 504,417, Jun. 15, 1983, abandoned. This application Oct. 30, 1986, Ser. No. 926,809
Int. Cl.[4] B66B *5/20*
U.S. Cl. 414—662 **21 Claims**

1. Safety brake mechanism for a vertical lift having a lift carriage disposed for movement with respect to a lift carriage support, and which is raised, lowered, and positioned during such movement by a lift carriage drive and a flexible member connecting the lift carriage to the lift carriage drive so that the flexible member is normally under tension and exerts at least a predetermined pull upon the lift carriage while the lift carriage is being raised, lowered, and positioned; said safety brake mechanism, comprising:

(a) brake operating means connecting the lift carriage to the flexible member to transmit to the lift carriage at least the predetermined pull exerted by the lift carriage drive on the flexible member to raise, lower, and position the lift carriage;

(b) said brake operating means including at least four links of substantially equal size connected together proximate

their respective ends into a linkage rectangle by pivot pins;

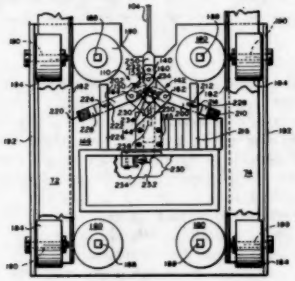
(c) brake means connected to said brake operating means and movable thereby between braking position in engagement with the lift carriage support and a brake unactuated position removed therefrom;

(d) said brake means including a first brake arm and a second brake arm;

(e) a first one of said pivot pins connecting said brake operating means to said lift carriage, a second one of said pivot pins connecting said brake operating means to said flexible member, a third one of said pivot pins connecting said brake operating means to said first brake arm and the fourth one of said pivot pins connecting said brake operating means to said second brake arm;

(f) a brake spring urging said first brake arm and said second brake arm towards said braking position in engagement with the lift carriage support;

(g) said brake means being moved to said brake unactuated



position by said brake operating means and against the urging of said brake spring, by at least the predetermined pull exerted upon the brake operating means when connecting the flexible member to the lift carriage;

(h) said brake spring moving said brake operating means into a brake operating condition and said brake spring and brake operating means moving said brake means to said braking position when less than the predetermined pull is exerted by the flexible member upon the brake operating means; and

(i) mounting means mounting said first brake arm and said second brake arm each for combined pivoting and sliding movement towards and away from the lift carriage support and for coaction therewith, and in such a way that said coaction, between said respective brake arm and the lift carriage support, through said brake operating means facilitates the operation of said brake operating means into said brake operating condition and thereby the coaction between said brake means and the lift carriage support to increase braking forces of one upon the other.

4,697,978

INDUSTRIAL ROBOT

Haruo Tada, Kobe, and Akiyoshi Nakada, Suita, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 26, 1985, Ser. No. 759,436
Claims priority, application Japan, Jul. 26, 1984, 59-155852
Int. Cl.[4] B25J *17/00*
U.S. Cl. 414—729 **5 Claims**

1. An industrial robot comprising:

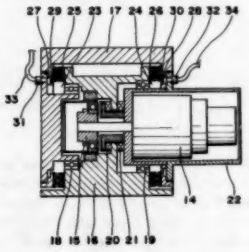
a plurality of arm members;

at least one arm joint having at least two joint members rotatable relatively to each other and to the respective ones of which a corresponding arm member is connected;

bearing members rotatably supporting said arm joint members for rotation relative to each other;

a driving member connected to said arm joint members for relatively rotating said plurality of arm members through said arm joint members;

cover means constituted by parts of at least two of said members and defining an internal space within said arm joint within which the remainder of said members are confined, said parts having at least one cover joint therebetween at which said parts are relatively rotatable and said cover joint extending through said cover means from the space around said arm joint to said internal space, each such cover joint providing an air flow throttling means



therethrough for connecting said internal space with the space around said arm joint, said throttling means being constituted by air flow path constricting means for throttling air flow through all of said cover joint for inhibiting flow of air between said internal space and the space around said arm joint; and

means for removing air from within said internal space consisting of air suction means connected to said cover means for sucking air from said internal space, whereby the internal space is kept at a reduced pressure as compared with the space around said arm joint and air flows only into said internal space through said throttling means.

4,697,979

ROBOT SYSTEM SAFETY METHOD

Seiichiro Nakashima; Kenichi Toyoda; Shinsuke Sakakibara, and Nobutoshi Torii, all of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP85/00039, § 371 Date Sep. 23, 1985, § 102(e) Date Sep. 23, 1985, PCT Pub. No. WO85/03472, PCT Pub. Date Aug. 15, 1985
PCT Filed Jan. 31, 1985, Ser. No. 782,714
Claims priority, application Japan, Jan. 31, 1984, 59-015787
Int. Cl.[4] B25J *9/00*
U.S. Cl. 414—786 **7 Claims**

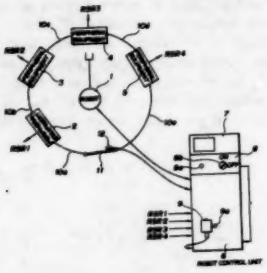
1. A safety method for a robot system including at least a robot, peripheral equipment serviced by the robot, a robot control unit which causes the robot to execute predetermined services for the peripheral equipment in accordance with a robot control program, a teach control panel which can be operated to select a repeat mode and a teach mode and to move the robot, and a manual data input unit with a CRT which can also be operated to select the repeat mode and the teach mode and to move the robot, comprising the steps of:

(a) providing a safety switch for terminating automatic operation of the robot when the robot is in an automatic operating state, providing a remote changeover switch for determining the operating state of the robot, and providing an enable switch on the teach control panel for enabling operation of the teach control panel and the manual data input unit alternately;

(b) establishing the automatic operation of the robot by

selecting the repeat mode and by placing the remote changeover switch in the ON position;

(c) decelerating and stopping robot motion in the automatic operating state when the safety switch is actuated, so that the robot is placed in a playback operating state; and



(d) enabling control from the teach control panel only while the safety switch remains in the actuated state and the enable switch is in the ON position, and enabling control from the manual data input unit only when the safety switch remains in the actuated state and the enable switch is in the OFF position.

4,697,980

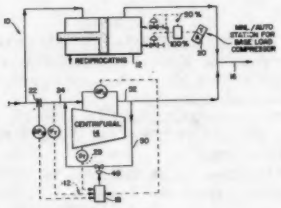
ADAPTIVE GAIN COMPRESSOR SURGE CONTROL SYSTEM

Marion A. Keyes, IV, Chagrin Falls, and Jeremiah J. Shaffer, Euclid, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Division of Ser. No. 642,284, Aug. 20, 1984, Pat. No. 4,627,788. This application Nov. 4, 1985, Ser. No. 794,597

Int. Cl.[4] F04D *27/02*

U.S. Cl. 415—1 **2 Claims**



1. A method of controlling normal and emergency surge in a centrifugal compressor having a predetermined surge line and a bypass valve controlled by a variable gain controller comprising the steps of:

measuring a surge control line offset from the compressor surge line according to a function of pressure differentials associated with the inlet pressure to the compressor and the pressure across the compressor;

establishing a controller gain control signal which is a function of the offset of the surge control line from the surge line; and

using the controller gain control signal to vary the gain of the controller according to the offset of the surge control line from the surge line for normal surge conditions and to provide additional gain to the controller at a predetermined offset for emergency surge conditions.

4,697,981

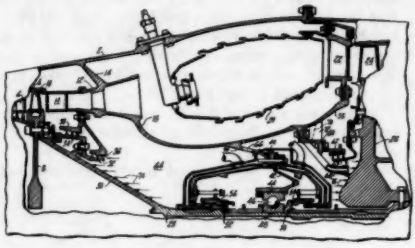
ROTOR THRUST BALANCING

Wayne M. Brown, North Granby; William F. Neal, South Windsor, and Frederick M. Schwarz, Glastonbury, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 13, 1984, Ser. No. 681,332

Int. Cl.[4] F01D *3/00*

U.S. Cl. 415—104 **3 Claims**



1. A gas turbine construction in which the air thrust pressures on the rotor are balanced including:

a compressor disk having a row of blades thereon,

a turbine disk having a row of blades thereon,

a shaft connecting said disks and having a conical portion adjacent to the compressor disk and forming, with said disks, the rotor,

a first seal carried by said conical portion,

a fixed seal cooperating with said first seal,

a second seal carried by the turbine disk,

a fixed second seal cooperating with said second seal,

a bearing for the shaft between the disks,

a housing surrounding said bearing,

a structure surrounding said housing and defining a compartment extending between the compressor and turbine disks and having as a part of the boundry thereof the conical portion of the shaft radially inward of the first seal and, as another part, the portion of the turbine disk radially inward of the second seal, and

means for pressurizing the compartment wherein an inner wall of combustion chamber, a support extending from said inner wall to the housing to maintain it in relation to the inner wall and holes in said support to balance the pressure on opposite sides thereof, wherein the first and second seal are at substantially the same radius with respect to the rotor thereby to expose substantially the same area to the pressure in said compartment.

4,697,982

ROTARY PULP SCREEN OF THE HORIZONTAL TYPE HAVING PULP STOCK FEED AT DIFFERENT AXIAL POSITIONS ON THE SCREEN

Anthony W. Hooper, Montreal, Canada, assignor to Uniweld Inc., Sherbrooke, Canada

Continuation-in-part of Ser. No. 839,829, Mar. 13, 1986, abandoned, which is a continuation of Ser. No. 586,816, Mar. 6, 1984, abandoned. This application Jul. 23, 1986, Ser. No. 888,220

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.[4] F04D *29/70*

U.S. Cl. 415—121 G **23 Claims**

1. In a rotary pulp screening device of the horizontal pressure type, including a cylindrical housing having means defining an inlet chamber and a screening chamber with a disc ring dividing the inlet chamber from the screening chamber,

horizontal cylindrical screen within the screening chamber, rotary impeller mounted for rotation about a central hori-

zontal axis within the screen, the impeller having a body with an inlet end adjacent to the disc ring and an outlet end adjacent the end of the cylindrical screen, the body having a shape with circular axial cross section from the inlet end to the outlet end whose diameter increases from the inlet end to the outlet end, thus leaving a larger annular space at the inlet end, and means defining an annular inlet between the disc ring and the body of the impeller,

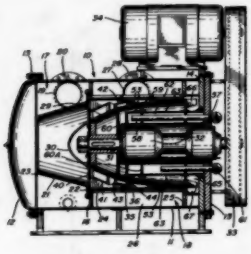
means for rotating the impeller,

impeller blades radiating from at least a portion of the body of the impeller and extending to within a short distance from the screen for the length of the screen, and

means defining a pulp discharge outlet from the screening chamber,

the improvement comprising:

at least one substantially frusto-conical shaped baffle extending from the annular inlet with the edge of the baffle



adjacent the inlet extending parallel to the edge of the baffle remote from the inlet, said baffle being disposed in the annular space between the body of the impeller and the screen, said baffle being joined to the impeller blades and having a shape to conform to the shape of the body of the impeller to define an annular axial cross sectional opening having a substantially equal axial cross sectional area from one edge of the baffle to the opposite end thereof, said baffle forming means dividing the flow of pulp stock entering the annular inlet so that a portion of the pulp stock entering the annular inlet passes across the exterior surface of the baffle and a portion of the pulp stock entering the annular inlet passes between the baffle and the body of the impeller and whereby the substantially equal axial cross sectional area from one end of the baffle to the opposite end thereof maintains a substantially constant axial velocity of the pulp stock passing between the baffle and the body of the impeller.

4,697,983

STEAM INTRODUCING PART STRUCTURE OF STEAM TURBINE

Hiroshi Yamaguchi, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 8, 1985, Ser. No. 785,599

Claims priority, application Japan, Oct. 15, 1984, 59-214373

Int. Cl.[4] F01D *25/26*

U.S. Cl. 415—134 **4 Claims**

1. A steam introducing part structure of a steam turbine having a rotor with first stage moving blades, comprising:

an outer casing with a main steam inlet;

an inner casing disposed in and separate from said outer casing;

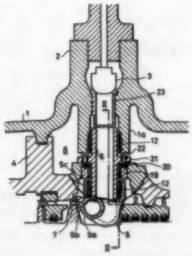
a 180 degree nozzle box disposed in and separate from said inner casing and having a chest and nozzles which are formed in an arc of about 180 degrees in said chest and face the first stage moving blades of the rotor, said 180 degree nozzle box being secured to said inner casing about a horizontal abutment face thereof;

a steam introducing pipe provided between the outer casing and nozzle box and passing through said inner casing for introducing main steam from said main steam inlet of said outer casing into said nozzle box;

said steam introducing pipe having a flange about the middle portion, and being separate from and independent of each of said inner and outer casings and said nozzle box,

said flange of said steam introducing pipe being provided with a plurality of through holes arranged circumferentially;

said steam introducing pipe being airtightly secured to said inner casing by fastening said flange on said inner casing



with bolts, screwed in threaded holes provided in said inner casing at the positions corresponding to said through holes through said through holes of said flange;

one end portion of said steam introducing pipe being airtightly and slidably inserted in a hole formed in said outer casing at the main steam inlet portion through a seal ring, and the other end portion being inserted in a steam inlet of said nozzle box through a seal ring, for providing expansion of respective ends of said steam introducing pipe relative to said outer casing and said nozzle box so that the main steam from said main steam inlet is introduced into said nozzle box.

4,697,984

SUPPORTING STRUCTURE FOR UNDERWATER STRUCTURE

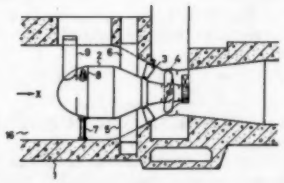
Mamoru Takeuchi, Hitachi; Sadao Nemoto, Hitachioota; Shizuo Suzuki, Iwaki, and Juichiro Kawai, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 19, 1986, Ser. No. 830,940

Claims priority, application Japan, Feb. 20, 1985, 60-30489

Int. Cl.[4] F01D *15/10*; F04D *29/60*

U.S. Cl. 415—142 **11 Claims**



1. A supporting structure for an underwater structure, disposed in a waterway defined by a stationary and supported at least two places thereof each spaced from each other in a direction of water flow in said waterway, which supporting structure is for supporting at least one of said at least two places and comprises a shell, one end of which is connected to said underwater structure and the other end to said stationary, and a plurality of elongated members, inserted within said shell and formed, as a whole, to be smaller in flexural rigidity in a water flow direction than in a perpendicular direction to the

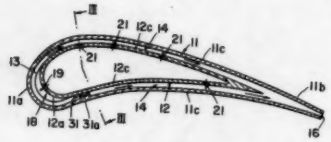
water flow direction, said plurality of elongated members each supporting said underwater structure on said stationary.

4,697,985

GAS TURBINE VANE

Isamu Suzuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 6, 1985, Ser. No. 708,801
Claims priority, application Japan, Mar. 13, 1984, 59-47544
Int. Cl.[4] F01D *5/18*
U.S. Cl. 416—97 R **10 Claims**



1. A gas turbine vane comprising:

an outer vane member of hollow vane shape having flank walls, an exterior surface and an inner wall surface, the inner wall surface having a plurality of spaced-apart projections thereon extending in a vane chordwise direction;

an insertion member of hollow shape having flank wall parts and being inserted into said outer vane member and tightly engaged with said projections;

a turbulence chamber formed between said outer vane member at a leading edge part thereof and said insertion member;

means for carrying cooling fluid from said turbulence chamber to a plurality of rear exhaust ports, said carrying means comprising a plurality of cooling passages which are laterally distinct from one another formed between said outer vane member, said insertion member, and said projections;

first fluid injection means for injecting fluid into said turbulence chamber;

second fluid injection means positioned intermediate between said turbulence chamber at the flank wall parts of said insertion member and said exhaust ports for feeding injecting fluid into each of said cooling passages to further cool a trailing edge portion of said outer vane member;

flow restricting means disposed in each of said cooling passages to control the length of time spent by said fluid in said turbulence chamber and to control the pressure of said fluid in said turbulence chamber; and

means for film cooling the exterior surface of said outer vane member, said film cooling means including a plurality of slots positioned at the flank wall of said outer vane member and means for allowing one-way flow of fluid between said cooling passages and the exterior surface of said outer vane member.

4,697,986

HELICOPTER BLADE CYCLIC PITCH CONTROL SYSTEM

Constant V. David, 4952 Field St., San Diego, Calif. 92110

Continuation-in-part of Ser. No. 593,047, Mar. 26, 1984, Pat. No. 4,650,400. This application Aug. 6, 1986, Ser. No. 893,700
Int. Cl.[4] B64C *27/605*
U.S. Cl. 416—114 **23 Claims**

1. A helicopter blade cyclic pitch control system, said system comprising:

a fixed housing for mounting on an airframe;

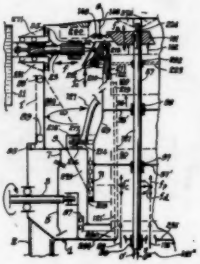
a rotatable housing mounted on said fixed housing for rotating about a substantially vertical axis;

a plurality of blades, each having a pitch axis substantially orthogonal to said substantially vertical axis, rotatably mounted at an inner end to said rotatable housing and extending radially outward therefrom for rotation about said pitch axis;

a central support shaft mounted within said housings and extending along said substantially vertical axis;

cyclic pitch control means comprising an axially moveable radial cam system non-rotatably mounted on said central support shaft from imposing a selective cyclic pitch on said blades as said rotatable housing rotates about said vertical axis; and

collective pitch control means comprising an axially movable cam mounted on said support shaft for axial movement thereon, pilot input control means for selectively moving said axially movable cam along said central support shaft, and a push-pull follower positively engaging said cam and operatively connected to said blades for independently imposing a collective pitch on said blades independently of said cyclic pitch control means;



whereby the axially moveable radial cam system non-rotatably mounted on the central support shaft includes a two-dimensional cam also non-rotatably mounted on the central support shaft and capable of axial movement thereabout, said axial movement being independently imposed by axially actuating means controlled by the helicopter forward velocity and independent of pilot control, thereby enabling the cyclic pitch control means to superimpose a non-sinusoidal programmed pitch variation on the collective pitch of the blades, said non-sinusoidal pitch variation being determined independently by the position of the blade in its rotation about the vertical axis and by the helicopter forward speed, albeit remaining independent of the collective pitch adjustment onto which said non-sinusoidal variation is superimposed.

4,697,987

ROTARY MACHINE HAVING AN IMPELLER WITH A SLEEVE FIXEDLY MOUNTED TO A SHAFT

Kazuzo Katayama; Taku Ichiryu; Tsuneyoshi Mitsuhashi; Yasushi Mouri, and Masanori Kobayashi, all of Takasago, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 25, 1986, Ser. No. 832,600
Claims priority, application Japan, Jun. 19, 1985, 60-91554[U]
Int. Cl.[4] F01D *5/04*
U.S. Cl. 416—204 A **5 Claims**

1. A rotary machine comprising:

a rotatable shaft, and

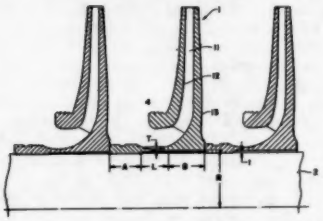
an impeller fixedly mounted to said rotatable shaft wherein said impeller comprises:

an impeller body;

a substantially thin-walled sleeve portion positioned at a predetermined distance with respect to said impeller body along a longitudinal axis of said rotatable shaft, and wherein said sleeve portion is shrink fitted to said rotatable shaft; and

a substantially thin-walled cylindrical web portion con-

necting said thin-walled sleeve portion to said impeller body, whereby essentially only bending forces are exerted on said substantially thin-walled cylindrical web portion by centrifugal forces exerted on said impeller body during operation of said rotary machine.

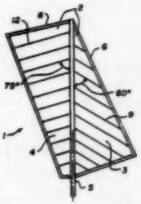


4,697,988

REINFORCED DELTA-WING BLADE FOR WIND TURBINE

John A. C. Kentfield, and Ian MacGregor, both of Calgary, Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy & Natural Resources, Edmonton, Canada

Filed Feb. 4, 1986, Ser. No. 825,879
Int. Cl.[4] F03D *1/06*
U.S. Cl. 416—237 **5 Claims**



1. A blade assembly for the rotor of a wind turbine comprising:

a substantially rigid spoke;

a thin flexible skin member comprising a flat-plate type delta-wing and a flap extension extending angularly from the trailing edge of said delta-wind;

said spoke lying along the junction of the delta-wing and the flap extension;

a plurality of reinforcing, substantially rigid ribs, said ribs being secured to said spoke and being connected with the skin member, said ribs being disposed on the pressure surface only thereof and protruding substantially perpendicularly therefrom, said ribs being positioned to substantially coincide with the direction of the local surface air flow over said pressure surface.

4,697,989

ELECTRODYNAMIC PERISTALTIC FLUID TRANSFER DEVICE AND METHOD

Gena Perlov, 18 Disraeli Street, Haifa, and Samuel Tuchman, 15 Hanarkissim Street, Kiryat Bialik, both of Israel

Division of Ser. No. 256,522, Sep. 22, 1981, Pat. No. 4,498,850. This application Oct. 11, 1984, Ser. No. 659,666
Claims priority, application Israel, Apr. 28, 1980, 59942
Int. Cl.[4] F04B *17/00*
U.S. Cl. 417—53 **17 Claims**

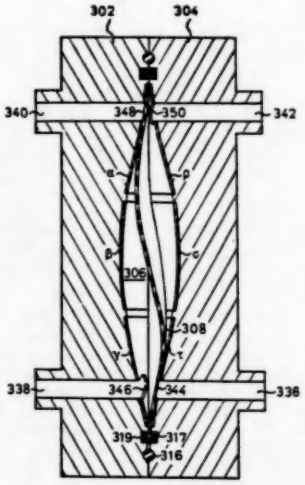
1. A device for fluid transfer comprising:

a housing-like body with at least one wall having at least one concavity, at least one of said concavities being provided with electrically conductive surface elements;

at least one electrically conductive diaphragm fixedly mounted in said body capable of forming, in conjunction with said concavity, one or moe pocket-like chambers;

at least one inlet and one outlet aperture located at the periphery of said concavity;

means for selectively applying an electric current to each of said electrically conductive elements and said electrically conducting diaphragm to generate, in a predeterminable sequence, a plurality of interacting electromagnetic fields of controllably changing polarities and intensities producing by a combination of forces of attraction and repulsion cycles of dynamic deflections of said diaphragm, whereby by means of said electrodynamically generated deflections of said diaphragm, said pocket-like chambers are peristaltically manipulated to move fluid from the region of said inlet aperture through which said fluid is drawn in, towards the region of said outlet aperture, through which said fluid is expelled.



4,697,990

VARIABLE CAPACITY VANE PUMP WITH MEANS TO VARY THE AREA OF OVERLAP

Jörg Dantlgraber, Lohr-Sackenbach; Josef Büdel, Wiestahl-Krommenthal, and Josef Rüb, Lohr-Steinbach, all of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Jan. 27, 1986, Ser. No. 823,110
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502519
Int. Cl.[4] F04B *23/10, 49/00;* **F04C** *2/344, 15/02*
U.S. Cl. 417—204 **15 Claims**

1. A vane pump comprising a housing,

a cam ring within said housing adapted for movement between the position of minimum and a position of maximum excentricity,

a rotor rotatably mounted in said housing and located in said cam ring,

vanes slidably projecting from the periphery of the rotor and defining fluid pressure chambers therebetween, said cam ring defining an inner surface along which said vanes move when said rotor is rotated,

input slot means provided in said housing means for supplying fluid to said pressure chambers,

output slot means provided in said housing means for outputting the pressurized fluid,

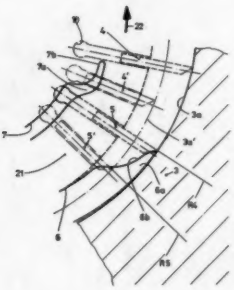
said input slot means defining a beginning and an end,

said output slot means defining a beginning and an end,

wherein the circumferential distance between the end of the

input slot means and the beginning of the output slot means defines an area of ovrlap within which a pumping chamber is separated from the input slot means and the output slot means, and

wherein at least one of the end of the input slot means and the beginning of the output slot means includes a bight portion extending towards the other of said slot means, said bight portion having a width that gradually changes



along substantially the entire length thereof such that when the cam ring is moved from a position of substantially maximum excentricity towards a position of substantially minimum excenticity, the effective length of said at least one of said input slot means and said output slot means is gradually decreased, whereby the area of overlap between the end of the input slot means and the beginning of the output slot means is increased.

4,697,991

ROTARY PUMP HAVING CLUTCH WHICH SELECTS SUITABLE POWER SOURCE

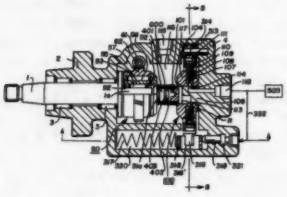
Kengi Tsukahara, Oubu; Kazuma Matsui, Toyohashi; Taizoh Abe, Chiryu, and Masahiko Suzuki, Hoi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

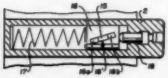
Continuation-in-part of Ser. No. 720,737, Apr. 8, 1985, abandoned. This application May 23, 1986, Ser. No. 869,860

Claims priority, application Japan, Apr. 9, 1984, 59-71423; May 24, 1984, 59-106167

Int. Cl.[4] F04B *1/06;* **F16D** *9/00*

U.S. Cl. 417—219 **5 Claims**





1. A rotary pump, comprising:

a housing,

a clutch system provided in said housing, and including:

a driven shaft, and

a clutch means constructed and arranged for transmitting rotational power of a rotary power source to said driven shaft, and

a pump portion provided in said housing and including:

a rotor means connected with said driven shaft and being constructed and arranged for rotating simultaneously with a rotation of said driven shaft,

a cylinder formed in said rotor,

a piston slidably provided in said cylinder and having a top portion thereof protruding from said cylinder,

a cylindrical guid ring rotably provided between said top portion of said piston and said housing, said guide ring having a longitudinal axis which is eccentric relative to that of said rotor,

a working chamber being formed between said cylinder and a bottom portion of said piston and the effective volume of which is arranged to be varied in accordance with the rotation of said rotor means,

fluid inlet and outlet port means provided to and from said working chamber so that a working fluid pumped as said rotor means rotates,

an eccentric ring provided between said housing and said guide ring, one part of said eccentric ring being pivotally connected with said housing and an opposite part from said one part being held by a slider in such a manner that said eccentric ring is swung in accordance with movement of said slider so that the eccentric distance between said longitudinal axis of said guide ring and that of said rotor is controlled by movement of said slider, and

said slider being slidably held in a control groove provided in said housing in such manner that said slider slidably reciprocates within said control groove, said control groove having a longitudinal axis that is arranged to be perpendicular to the rotating direction of said rotor, and said longitudinal axis of said control groove being arranged to be parallel with a longitudinal axis of said driven shaft.

4,697,992

PISTON RING FOR A PISTON IN A REFRIGERANT COMPRESSOR

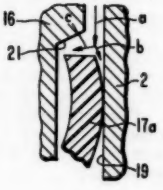
Hideharu Hatakeyama, and Hidenao Takahashi, both of Isesaki, Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Feb. 12, 1986, Ser. No. 828,676

Claims priority, application Japan, Feb. 20, 1985, 60-21904[U]

Int. Cl.[4] F01B *31/10;* **F04B** *1/18;* **F16J** *9/20, 9/28*

U.S. Cl. 417—269 **5 Claims**



1. In a refrigerant compressor including a compressor housing having a plurality of cylinders and a crank chamber adjacent said cylinders, a reciprocable piston slidably fitted within each of said cylinders, a driving mechanism coupled to said pistons to move said pistons in a reciprocating motion, a valve plate with valve openings covering one end of said cylinders and a cylinder head covering said valve plate and including a suction chamber and a discharge chamber aligned with said valve openings, the improvement comprising two annular grooves provided toward opposite ends on the outer peripheral surface of each of said pistons and a conical shaped piston ring disposed within each of said annular groove, each said piston ring having an outer diameter larger than the outer

diameter of said piston at normal temperatures, each said piston ring having an outer surface facing the wall of the cylinder in which the ring is located and having an inner surface facing toward the center of the piston on which the ring is located, each ring having the outer surface curved convexly in an axial direction and having the inner surface curved concavely in an axial direction, each conical piston ring being curved so that the outer diameter of said curved surface at one end of each of said piston rings is longer than that at the other end to form the base of the conical ring, and wherein one of said piston rings on each piston is disposed on said piston with the base of said conical shaped piston ring facing said valve plate, the thickness of each ring between the inner and outer surfaces being significantly less than half the height of the ring.

4,697,993

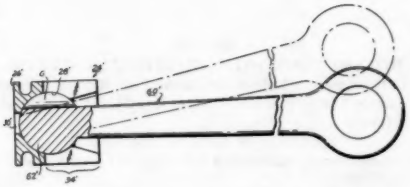
FLUID MEDIUM COMPRESSOR AND USER APPARATUS

Edward B. Chamberlin, Short Hills; Edward M. Brown, Livingston, and Edward J. Towns, Morristown, all of N.J., assignors to Spray-All, Inc., Millburn, N.J.

Continuation-in-part of Ser. No. 523,127, Aug. 15, 1983, Pat. No. 4,631,003. This application Aug. 10, 1984, Ser. No. 640,082

Int. Cl.[4] F04B *7/00*

U.S. Cl. 417—514 **8 Claims**



1. Apparatus for compressing a fluid medium comprising a housing having fluid medium inlet and outlet ports, a piston supported for displacement in said housing, said piston defining a fluid compression surface and having a substantially hollow interior and a fluid flow passage extending through said piston and said fluid compression surface, said hollow interior being in fluid communication with said fluid flow passage a drive source, and driven means having a longitudinal axis, said driven means interconnecting said piston and said drive source and including valve means mounted within said hollow interior and formed with an exterior groove, said valve means comprising a knob member having an outer surface with a diameter substantially equal to the inner diameter of said hollow interior and disposed in said hollow interior of said piston for providing a joint connecting said driven means and said piston in driving relation, said exterior groove having a longitudinal flow axis and being formed in the other surface of said knob member so that said flow axis extends substantially parallel to the longitudinal axis of said driven means, said driven means displacing said piston alternately in first and second oppositely-directed strokes said piston resiliently enclosing said valve means and enabling limited relative rotation of said piston and said valve means with respect to each other as said piston is displaced in said first and second strokes, said relative rotation being such as to preclude flow communication through said exterior groove between said passage and said inlet port during said displacement of said piston in said first stroke and as to place said passage in flow communication with said inlet port through said exterior groove during said displacement of said piston in said second stroke.

4,697,994

MULTISTAGE DISCHARGE TYPE ROTARY VACUUM PUMP

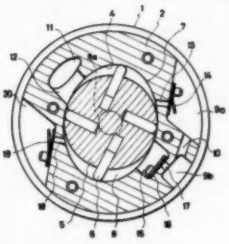
Tadao Ishizawa; Hirofumi Kotaka, and Masami Kakinuma, all of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Chiba, Japan

Filed Dec. 20, 1984, Ser. No. 684,126

Claims priority, application Japan, Dec. 28, 1983, 58-251034

Int. Cl.[4] F04C *18/344, 25/02*

U.S. Cl. 418—8 **5 Claims**



1. A multistage rotary vacuum pump for evacuating gas from a confined space, comprising: a casing; a cylinder housed within the casing and having means therein defining a cylinder chamber; a rotor mounted to undergo rotation in a given direction within the cylinder chamber and coacting therewith to divide the cylinder chamber into at least first stage and second stage working chambers; a plurality of radially extending vanes slidably mounted in the rotor in angularly spaced relation therearound to undergo radial movement such that the vane tips maintain sliding contact with the wall of the cylinder chamber during rotation of the rotor; means defining an inlet port opening into the upstream side of the first stage working chamber for admitting thereinto gas evacuated from a confined space in response to rotation of the rotor; means defining an inlet port opening into the upstream side of the second stage working chamber; means defining an outlet port at the downstream side of each working chamber for discharging therefrom gas which has been compressed in the working chamber in response to rotation of the rotor; and pressure-responsive storage means housed entirely within the casing and communicating with the outlet port of the first stage working chamber for receiving therefrom and cumulatively storing therein the compressed gas and communicating with the inlet port of the second stage working chamber for admitting thereinto the stored compressed gas whenever the pressure thereof reaches a predetermined value, the pressure-responsive storage means comprising means defining a pair of compartments separated from one another by a wall, one of the compartments communicating with the outlet port of the first stage working chamber and the other of the compartments communicating with the inlet port of the second stage working chamber, a throughbore extending through the wall to provide fluid communication between the pair of compartments, and pressure-responsive valve means for admitting compressed gas stored in said other compartment to the inlet port of the second stage working chamber when the pressure thereof reaches a predetermined value.

4,697,995

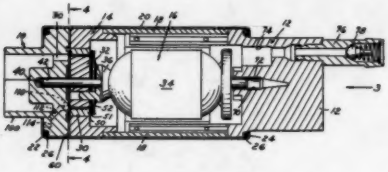
ROTARY POSITIVE DISPLACEMENT FUEL PUMP WITH PURGE PORT

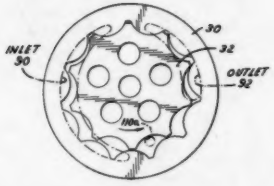
Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 717,563, Mar. 29, 1985, abandoned, and a continuation-in-part of Ser. No. 642,777, Aug. 21, 1984, Pat. No. 4,596,519. This application May 8, 1986, Ser. No. 860,866

Int. Cl.[4] F04C 2/10, 15/02

U.S. Cl. 418—15 3 Claims





1. In a rotary pump for pumping a volatile liquid,

(a) a rotor combination utilizing circumferentially disposed expanding and ensmalling, positive-displacement pumping chambers,

(b) a first circumferential reduced pressure inlet area on said rotor combination,

(c) a second cirumferential increased pressure outlet area on said rotor combination spaced circumferentially from said first area, and a neutral zone between said areas,

(d) a first means on one side of said rotor combination comprising a stationary inlet housing having an inlet opening at one portion and a face plate at another portion, said face plate lying directly adjacent one side of said rotor combination, said face plate having a passage and connected ports communicating with said inlet opening and with said first circumferential reduced pressure inlet area of said rotor combination, said face plate having also an outlet port at the trailing end of said second circumferential increased pressure outlet area and having a shallow recess open at one side to said outlet port and axially overlying substantially all of said increased pressure area,

(e) a stationary outlet housing means forming an outlet chamber on the side of said rotor combination opposite said inlet housing and in communication with said outlet port of said inlet housing,

(f) second means closing said pumping chambers on the other side of said rotor combination,

(g) power means to rotate said rotor combination and

(h) a first thin flexible resilient disc member interposed between said one side of said rotor combination, and said face plate of said inlet housing having a first aperture to register with said inlet opening and said first circumferential inlet area and a second aperture in substantial registry with said outlet port in said inlet housing and a closed portion overlying said shallow recess,

whereby liquid pressure developing in pumping chambers in said second circumferential area will move the portion of said resilient plate overlying said shallow recess into said recess away from said rotor combination to allow fluid under pressure to reach said outlet port while preventing backflow of liquid under pressure from said outlet port to the upsiream portion of said second circumferential area,

(i) said second means closing said pumping chambers on the other side of said rotor combination comprising a second flexible, resilient sealing disc having one surface lying directly against said rotor combination and the opposite surface exposed to pressure in said outlet housing and having a flexible peripheral margin terminating radially outwardly of said pumping chambers, said margin being free to move away from said rotor combination against pressure in said outlet housing in response to higher pressure in said second circumferential area but acting also to prevent backflow of liquid under pressure from said outlet housing, and

(j) means forming a circumferentilly localized purge port in said stationary inlet housing and said first resilient disc positioned between said inlet and outlet areas but independent of said outlet port and said shallow recess, and open at an inner end to said rotor combination and at the other end to the outside of said inlet housing to allow vapor in chambers of said rotor combination to be expelled through said port.

4,697,996

ROTARY PUMP WITH ADJUSTABLE CAM RING

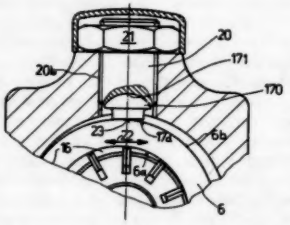
Jörg Dantlgraber, Lohr-Sackenbach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 864,860

Claims priority, application Fed. Rep. of Germany, May 20, 1985, 3518090

Int. Cl.[4] F04C 2/344, 15/04

U.S. Cl. 418—31 6 Claims



1. An adjustable vane-type pump comprising:

a housing within which cam ring is located,

a rotor rotatably mounted within said cam ring,

means for adjusting the cam ring in horizontal direction so as to change the amount of fluid supplied by the pump, and

supporting means arranged within a height level adjustment screw which is adapted to adjust the desired height level of the cam ring, said supporting means including a unitary supporting body, said supporting body having a spherical surface adapted to be pivotally mounted in the adjustment screw and an abutment surface for abutment with the outer surface of the cam ring,

whereby an adjustment of the cam ring in the horizontal direction within a predetermined range does not change the height level of the cam ring.

4,697,997

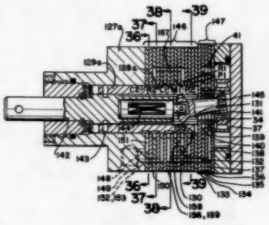
ROTARY GEROTOR HYDRAULIC DEVICE WITH FLUID CONTROL PASSAGEWAYS THROUGH THE ROTOR

Hollis N. White, Jr., 707 Tamiami Trail, W. Lafayette, Ind. 47906

Continuation of Ser. No. 603,994, Apr. 26, 1984, abandoned, which is a continuation of Ser. No. 390,328, Jun. 21, 1982, abandoned, and a continuation-in-part of Ser. No. 360,832, Mar. 23, 1982, which is a continuation-in-part of Ser. No. 113,400, Jan. 18, 1980, which is a continuation of Ser. No. 910,075, May 26, 1978. This application Mar. 14, 1986, Ser. No. 840,993

Int. Cl.[4] F03C *2/24;* B23P *15/00*

U.S. Cl. 418—61 B 13 Claims



1. In a gerotor hydraulic pressure device having a body, an orbiting valve, gerotor cells, a rotor in a rotor cavity, the valve having input and output valving sections, and fluid passages within the body of the device next to the rotor cavity, such fluid passages including a plurality of spaced bi-directional passages for connecting the input and output valving sections in th orbiting valve to the gerotor cells, the improvement of part of the body of the device comprising a plurality of flat plates, said plates being formed with selective cross-sectional parts of the fluid passages within the body of the device, said plates being consecutively sequentially located flat surface to flat surface next to the cavity on a single side thereof, said plates being connected together in a leakproof manner to form passages, said passages extending axially and radially in said plates, means to fixedly connect said plates to the remainder of the body of the device, and substantially all of the fluid passages in the body of the device including the plurality of bi-directional passages connecting input and output valving sections in the orbiting valve to the gerotor bells being in said plates.

4,697,998

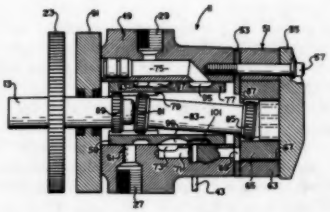
HYDRAULIC MOTOR HAVING INTEGRAL FLOW CONTROL CAPABILITY

Steven J. Zumbusch, Eden Prairie, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 697,596, Feb. 1, 1985, Pat. No. 4,613,292. This application Sep. 15, 1986, Ser. No. 907,710

Int. Cl.[4] F03C *2/08*

U.S. Cl. 418—61 B 17 Claims



1. A rotary fluid pressure device of the type including housing means defining a first fluid port, a second fluid port, and a spool bore; a gear set associated with said housing means and including a first toothed member and a second toothed member operatively associated with said first toothed member for relative movement therebetween, the teeth of said members interengaging to define expanding and contracting fluid volume chambers during said relative movement, one of said toothed members having rotational movement about its own axis; output shaft means extending from said housing means and rotatably supported thereby; a generally cylindrical spool member rotatably disposed within said spool bore; drive shaft means operable to transmit said rotational movement of said one of said toothed members into rotational movement of said spool member and said output shaft means, said drive shaft means cooperating with said spool member and said output shaft means to define connection means; said spool member defining first and second annular grooves on the outer periphery thereof, said first annular groove being in continuous, relatively unrestricted fluid communication with said first fluid port, and said second annular groove being in continuous, relatively unrestricted fluid communication with said second fluid port when said spool member is in its normal position; said spool member and said housing means cooperating to define first fluid passage means communicating between said first annular groove and said expanding volume chambers, and second fluid passage means communicating between said contracting volume chambers and said second annular groove; characterized by:

(a) said connection means being operable to permit axial movement of said spool member relative to said drive shaft means and said output shaft means, said spool member being movable from said normal position to another position in which fluid communication between one of said first and second fluid ports and the respective one of said first and second annular grooves is at least partially restricted; and

(b) actuation means operable to effect axial movement of said spool member between said normal position and said another position to achieve control of fluid flow through said device and of the speed of rotation of said output shaft means.

4,697,999

ROTARY PISTON ENGINE

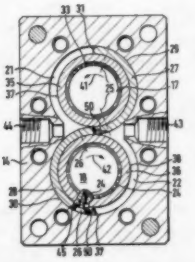
Kurt Jauch, Stritzling 191, 8351 Lalling, Fed. Rep. of Germany

Filed Dec. 9, 1985, Ser. No. 807,033

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1984, 3445979; European Pat. Off., Nov. 29, 1985, 85115187.8

Int. Cl.[4] F01G *1/18*

U.S. Cl. 418—191 12 Claims



1. A rotary piston engine, comprising

a casing (10) in which two cylinder chambers (21, 22) are formed so as to overlap each other between an inlet (43) and an outlet (44),

two shafts (17, 18), each extending through a respective one of the cylinder chambers (21, 22), and both being interconnected for rotation in an opposite sense,

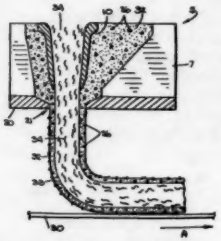
two complementary rotary pistons (27, 28), each fixed to a respective one of the shafts (17, 18), and each including a respective exterior face (29, 30) which is coaxial with the corresponding shaft (17, 18) said exterior faces (29, 30) periodically forming sealing zones with the casing (10) and, in the overlapping area of the two cylinder chambers (21, 22), at least one sleeve (35, 36) is arranged between each of the rotary pistons (27, 28) and the corresponding shaft (17, 18) to periodically establish sealing with respect to the complementary rotary piston (27, 28), each said sleeve (35, 36) being supported for rotation on the corresponding shaft (17, 18), and forming an exterior face (37, 38) which is coaxial with the shaft, where said exterior faces (29, 30) of each complementary piston (27, 28) periodically engage said exterior faces (37, 38) of each sleeve (35, 36) to periodically drive in rotation each said sleeve (35, 36) at a speed greater than that of the corresponding rotary piston (27, 28) and shaft (17, 18).

4,698,000

APPARATUS FOR CO-EXTRUSION OF A DOUGH MASS WITH PARTICULATE MATTER IN THE OUTER DOUGH

Robert Thulin, Wyckoff; Robert E. Ross, Wayne, and Nicholas Polifroni, Cliffside Park, all of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.

Division of Ser. No. 630,126, Jul. 12, 1984, Pat. No. 4,579,744.
This application Jan. 14, 1986, Ser. No. 819,153
Int. Cl.[4] B29C *47/26*
U.S. Cl. 425—133.1 **7 Claims**



1. A co-extrusion apparatus for forming a composite food product having dissimilar inner and outer portions, wherein the inner portion is enveloped by the outer portion, and the outer portion is a dough which contains particles, comprising:

an inner extrusion port having an exit orifice with a first cross-sectional area through which the inner portion is extruded;

an outer extrusion port, including

an exit orifice with a second cross-sectional area greater than said first cross-sectional area;

means for substantially removing dough from the parts of the particles that penetrate the exterior surface of the outer dough portion, said removing means being positioned adjacent said exit orifice and within said outer extrusion port; and

means for inducing turbulence in the outer dough portion, including

a generally bevelled surface formed in said outer extrusion port the angle between said bevelled surface and said removing means being about 60°; and

a generally annular and sharp line of intersection between said bevelled surface and said removing means, whereby a tumbling motion is imparted to the particles carried within the outer dough portion for causing at least a portion of the particles to penetrate the exterior surface of the outer dough portion;

wherein said inner extrusion port is recessed a distance d from said exit orifice of said outer extrusion port to define an exit passage between said inner extrusion port and said outer extrusion port, said distance d being sufficient to permit the particles carried in said outer dough portion to pass through said exit passage;

first conduit means communicating with said inner extrusion port for providing the inner portion thereto; and

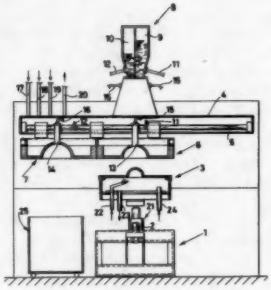
second conduit means communicating with said outer extrusion port for providing the outer dough portion thereto, the outer dough portion enveloping the inner portion to form a composite food product having dissimilar inner and outer portions.

4,698,001

MACHINE FOR THE PRODUCTION OF MOULDED ARTICLES OF PLASTIC MATERIAL, IN PARTICULAR OF CRASH HELMETS FOR MOTORCYCLISTS AND THE LIKE

Mario Vismara, Casatenovo, Italy, assignor to Devi S.p.A., Besana Brianza, Italy

Filed Jun. 14, 1985, Ser. No. 744,696
Claims priority, application Italy, Jun. 15, 1984, 22307/84[U]
Int. Cl.[4] B29C *33/34, 67/20*
U.S. Cl. 425—4 R **6 Claims**



1. Machine for the manufacturing of moulded articles of plastic material, in particular of helmets for motor cyclists, said machine comprising:

at least two moulds, and at least one counter-mould to be coupled with each of said least two moulds for the forming of said articles,

each of said at least two moulds and said at least one counter-mould defining moulding cavities therebetween,

at least two of said at least two moulds and said at least one counter-mould being connected with feed means having a different pre-foamed plastic material,

each of said at least two moulds being movable into alignment with said at least one counter-mould in a position for the moulding of respective at least partially superimposed layers of different foamed plastic material by sintering of said material,

steam means for supplying steam impulses to said moulding cavities during moulding of the material at each heating of the mould cavities said means being positioned to ensure sintering of the material of each layer of material and

one of said at least two moulds being positioned for unloading of an article produced while at least another of said at least two moulds is in another position coupled with the counter-mold for moulding and sintering of the respective material.

4,698,002

PNEUMATIC-TIRE HEATING AND VULCANIZING PRESS

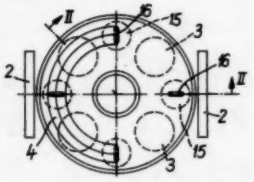
Klaus Grotkasten, Hamburg, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Fed. Rep. of Germany

Filed Dec. 5, 1985, Ser. No. 805,851

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1984, 3444688

Int. Cl.[4] B29C *35/02*

U.S. Cl. 425—28 R 12 Claims



1. A hydraulic tire heating and vulcanizing press, comprising:

a press stand;

a one-piece tire-forming lower mold part supported by said press stand and surrounding an upright axis;

an upper tire-forming mold part mounted on said stand and aligned with said lower mold part along said axis, said mold parts defining between them in a closed position of said press a mold provided with heating means in which a tire blank can be vulcanized and shaped to form a tire;

hydraulic means for moving one of said mold parts axially relative to the other of said mold parts to open and close said mold; and

centering means between said press stand and said one-piece tire-forming lower mold part effective in all operating temperature states of the press, even prior to the attainment of steady-state temperature operation, to permit movement radially of said axis between said lower mold part and said stand for maintaining a centered position of said lower mold part, said centering means comprising:

means forming at least two downwardly open radially extending grooves connected to said lower mold part,

means forming at least two upwardly open radially extending grooves respectively paired with said downwardly open grooves and connected to said stand, and

a respective radial key received in the upwardly and downwardly open grooves of each pair with play with respect to at least one of the grooves of the respective pair, said pairs of grooves and the respective keys being arranged symmetrically with respect to said axis.

4,698,003

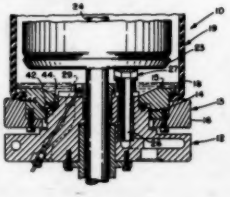
TIRE CURING PRESS

Anand P. Singh, Youngstown, Ohio, assignor to NRM Corporation, Columbiana, Ohio

Filed Aug. 27, 1986, Ser. No. 900,809

Int. Cl.[4] B29C *35/00*

U.S. Cl. 425—52 9 Claims



1. A center mechanism including a shaping bladder for a tire curing press comprising a bottom hub, a clamp ring assembly for the bladder, said clamp ring assembly and hub including cylindrical telescoping surfaces, and opposed axially facing surfaces, a sealing plate ring between said axially opposed facing surfaces, and static seal rings on axially opposite sides of said sealing plate ring and the respective axially opposed facing surfaces.

4,698,004

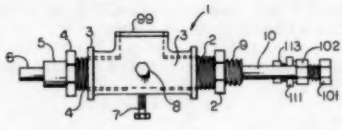
NOZZLE FOR EXTRUSION

Wayne D. Ramnarine, Bergenfield, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Filed Mar. 5, 1986, Ser. No. 837,003

Int. Cl.[4] B29C *47/30, 47/16, 47/04*

U.S. Cl. 425—131.1 3 Claims



1. An extrusion nozzle, comprising:

a body generally in the form of a tee having in-line opposite ends threaded to receive threaded plugs and a circular side opening for receiving dough for extrusion, one of said plugs having a central through aperture defining an extrusion orifice, the other of said plugs having plural conduits extending in a generally axial direction therethrough and into said extrusion orifice, a wall of said body having plural threaded screws extending therethrough for adjusting positions of said conduits relative to a central axis of the extrusion orifice.

4,698,005

SEALING APPARATUS

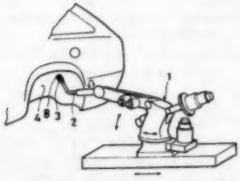
Uhee Kikuchi; Hiroyoshi Nozaki, both of Sayama; Masao Fukuda, Hidakamachi, and Toshihiko Satake, Fuchu, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 10, 1984, Ser. No. 680,130

Claims priority, application Japan, Oct. 3, 1984, 59-149055

Int. Cl.[4] B29C *69/02*

U.S. Cl. 425—163 5 Claims



1. A sealing apparatus for applying and spreading a filling and sealing agent into a joint, said apparatus comprising an industrial robot having a sealing gun with a nozzle provided on a forward end portion of the sealing gun which may be moved along a joint to be filled and sealed with a filling and sealing agent dispensed from said gun through said nozzle in accordance with a locus of a program previously programmed to the robot, characterized in that the nozzle includes a nozzle holder having a base portion fixed to the forward end of said sealing gun and a nozzle body extending forward from said base and through which said filling and sealing agent is dispensed to the joint to be filled and by which said dispensed agent is spread,

said nozzle body being of a flexible material connected to the nozzle holder and having a passage extending therethrough for dispensing said filling and sealing agent, said nozzle having an opening defined by an inner circumferential surface of a forward end portion of said nozzle body gradually widening towards the forward end thereof and a reinforcement pipe extending from said nozzle holder mounted in said nozzle body, the ratio of the length from the forward end of the reinforcement pipe to the forward end of the nozzle body to the length from the forward end of the nozzle holder to the forward end of the nozzle body being 0.3–0.8 said nozzle being free from rotary means for rotating said nozzle body during normal operation.

4,698,006

APPARATUS FOR THE REACTION MOULDING OF PLASTICS MATERIALS

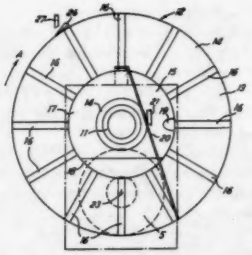
George T. Ralphs, Bradford-on-Avon, England, assignor to C. & J. Clark Limited, Somerset, England

Filed Mar. 31, 1986, Ser. No. 846,048

Claims priority, application United Kingdom, Apr. 12, 1985, 8509366

Int. Cl.[4] A04J *21/00*

U.S. Cl. 425—185 **14 Claims**



1. Apparatus for the reaction moulding of plastics materials, said apparatus comprising means for mixing together into a curable mixture liquid plastics components to be moulded, said mixing means having an outlet orifice through which the liquid components emerge, a pouring member formed with two or more passageways, at least one of which, at any one time, is in an operating position in which it is operable to transfer the material therethrough from the mixing means into a mould, means for indexing the passageways at regular intervals such that, at any one time, at least one passageway is out of use, and means for cleaning cured accumulated portions of the liquid plastics components from the at least one passageway which is out of use so that after such cleaning, the at least one passageway become available for re-use.

4,698,007

HORIZONTAL MOLD CLOSING UNIT FOR AN INJECTION MOLDING MACHINE

Karl Hehl, Artur-Hehl-Strasse 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,173

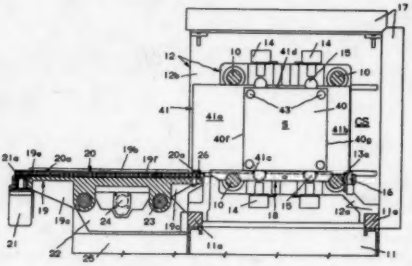
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1985, 3508867

The portion of the term of this patent subsequent to Jul. 31, 2001, has been disclaimed.

Int. Cl.[4] A01J *21/00*

U.S. Cl. 425—190 **15 Claims**

1. In a horizontal mold closing unit for an injection molding machine, an injection mold assembly having a mold body which includes opposite clamping sides for exposure to clamping forces exerted by the mold closing unit; a clamping space defined within said mold closing unit for accommodating said mold assembly in a working position thereof; said mold assembly being clamped by said mold closing unit in said clamping space; back plates attached face-to-face to the mold body at each clamping side thereof; the mold body having a frontal side and said back plates having an extended portion projecting beyond the mold body at said frontal side thereof; coupling means carried by said injection mold assembly at an underside thereof; a mold exchanging table arranged for displacement adjacent said mold closing unit in a direction parallel to a mold closing direction of said mold closing unit; an endless conveyor chain arranged to convey the injection mold assembly, by cooperating with said coupling means, from said mold ex-



changing table to the clamping space of said mold closing unit and conversely; the improvement wherein said endless conveyor chain has a chain driving end sprocket and an idling end sprocket mounted on said mold exchanging table and supporting said conveyor chain thereon; said conveyor chain being arranged symmetrically at either side of a vertical symmetry plane belonging to said mold exchanging table and extending parallel to said mold closing direction; said coupling means comprising transverse grooves provided in at least one of said back plates in at least said extended portion thereof; said transverse grooves extending transversely to a main plane of said back plate.

4,698,008

MELT SPINNING APPARATUS

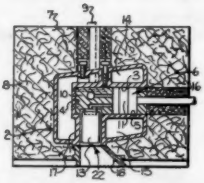
Erich Lenk, and Max Feth, both of Remscheid, Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 738,170, May 24, 1985, which is a continuation-in-part of Ser. No. 593,034, Mar. 23, 1984, Pat. No. 4,645,444. This application Jun. 20, 1985, Ser. No. 746,975

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1984, 3423087; Jul. 17, 1984, 3426211

Int. Cl.[4] D01D *4/08*

U.S. Cl. 425—192 S **14 Claims**



1. A melt spinning apparatus adapted for dividing a molten polymer into a plurality of streams to form synthetic filaments, and comprising

an elongate heating chamber which includes a bottom portion of hollow, double wall construction and which defines an upper surface, and a plurality of longitudinally

spaced apart nozzle casing receptacles extending vertically through said bottom portion of said chamber,

pump block means resting upon said upper surface of said bottom portion of said heating chamber so as to completely cover each of said nozzle casing receptacles, with said pump block means including a bottom surface opposing said upper surface of said bottom portion, and a plurality of cylindrical connecting plugs directly mounted to said bottom surface and aligned with respective ones of said receptacles, and further including a melt supply line extending through said pump block means and each of said connecting plugs, and

a nozzle assembly mounted within each of said receptacles, with each of said nozzle assemblies including a spin plate having a plurality of openings extending therethrough, a tubular casing enclosing and supporting said spin plate, and thread means formed on the associated cylindrical connecting plug and casing for releasably interconnecting said casing to the associated connecting plug and such that said melt supply line communicates with said openings of said spin plate, and whereby each nozzle assembly may be released from the associated connecting plug by rotation of said casing with respect to said plug and withdrawn vertically downwardly through the associated receptacle.

4,698,009

GRANULATOR FOR CROSS-LINKABLE PLASTIC

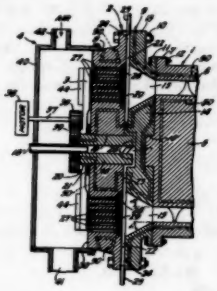
Carlo Marin, Vigevano; Gianmario Lanfranconi, Trezzo d'Adda, and Andrea Borroni, Carimate, all of Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan

Filed May 16, 1986, Ser. No. 864,039

Claims priority, application Italy, May 31, 1985, 20993 A/85

Int. Cl.[4] A01L *21/00*

U.S. Cl. 425—196 **7 Claims**



1. A granulator for forming granules of a cross-linkable plastic compound, said granulator comprising:

a filament forming die having an entrance side and an exit side, said die having a plurality of through-holes extending axially of said die from said entrance side to said exit side and disposed in circular rows concentric with the axis of said die;

conduit means for supplying said compound to said through-holes, said conduit means being annular and having an axis substantially co-extensive with said axis of said die and said conduit means having a funnel-shaped discharge portion at its end adjacent said die with the larger diameter end of the funnel-shaped discharge portion adjacent said die and with the inner and outer diameters of said discharge portion being respectively at least as small as and at least as large as the inner and outer diameters of said circular rows of through-holes in said die whereby said discharge portion of said conduit means opens towards and supplies said compound to all said through-holes around an axis substantially parallel to said axis of said die;

at least one rotatable blade at said exit side of said die for cutting said compound into granules as it exits from said through-holes; and

channel means forming at least one annular channel extending from adjacent said larger diameter end of said discharge portion and said entrance side of said die to exteriorly of said granulator for removing from the granulator the portions of said compound which engage a wall of said discharge portion as said compound is being supplied to said die through said conduit means.

4,698,010

PROCESS FOR THE FORMATION OF BLOCKS OF ANY MATERIAL BY MEANS OF THE CONTEMPORANEOUS ACTION OF VIBRATIONS, COMPRESSION AND VACUUM INTENDED FOR CUTTING INTO SLABS AND APPARATUS ADAPTED TO CARRY OUT THE SAID PROCESS

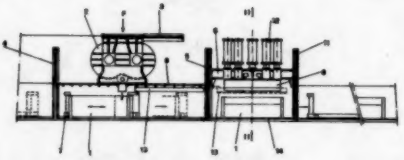
Marcello Toncelli, Via Giovanni XXIII, 2, Bassano Del Grappa, Vicenza, Italy

Filed Jul. 12, 1985, Ser. No. 754,235

Claims priority, application Italy, Sep. 14, 1984, 85632 A/84

Int. Cl.[4] A01J *17/00, 21/00;* **B29C** *41/22*

U.S. Cl. 425—200 **4 Claims**



1. A process for the formation of blocks of marble, stone and the like of size up to 305×125×80 cm from particles of marble, stone and the like of size up to 200 mm by the contemporaneous action of vibration, compression and vacuum which consists of:

(1) combining said particles with a binder in a mixer to obtain a mixture;

(2) mechanically mixing said mixture to obtain an homogeneous mixture;

(3) creating a vacuum in said mixer to obtain an homogeneous mass free of voids;

(4) discharging said mixture from step 3) into a mold in which a vacuum has also been created and maintaining said mold in motion;

(5) introducing said mold into a press in which a vacuum has been created;

(6) simultaneously compressing and vibrating said mixture in said press, by subjecting said mixture to the action of pneumatic cylinders impinging upon a beam which is in direct contact with said mixture; while maintaining the vacuum therein whereby the volume is reduced and blocks with no air voids are formed;

(7) discharging said blocks from said press and

(8) allowing the binder to set.

2. An apparatus for the formation of blocks of marble, stone and the like of size up to 305×125×80 cm from particles of marble, stone and the like of size up to 200 mm by contemporaneous action of vibration, compression and vacuum, said apparatus comprising:

a mixer for combining said particles with a binder, to obtain a mixture, mechanical means in said mixer for mixing said mixture to obtain an homogeneous mixture, a mold positioned relative to said mixture so as to receive said mixture from said mixer;

means for creating a vacuum in said mixer and in said mold;

a carriage connected to said mold for agitating said mold by an alternating motion and a translatory motion alternately;

a press having an opening for receiving said mold;

a tunnel for connecting said mold to said press;

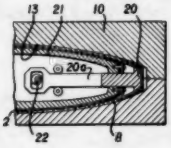
means for maintaining a vacuum in said press;
means for simultaneously compressing and vibrating said mixture in said press, which comprise a plurality of pneumatic cylinders connected to a beam, means for lowering said beam in contact with said mixture for creating vibrations and pressure on said mixture;
means for transporting said mold to said tunnel and
means for discharging the blocks from said press.

4,698,011

MANUFACTURE OF A HOLLOW ENVELOPE BY WINDING FILAMENTARY MATERIAL

Jean Lamalle, Blanquefort, and Jean-Louis Tijne, Martignas sur Jalle, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Jul. 18, 1985, Ser. No. 756,106
Claims priority, application France, Jul. 23, 1985, 8411641
Int. Cl.[4] B30B *5/02*
U.S. Cl. 425—389 **4 Claims**



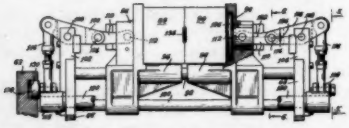
1. Apparatus for the manufacture of an elongate hollow envelope of a wound material comprising: a hollow mound having a cavity wall in a shape of an external form of the envelope and an elongate deformable mandrel which includes a rigid core, a headed portion extending longitudinally along the entire mandrel, said headed portion being movable towards or away from said cavity wall of said hollow mold and a flexible wall enclosing at least part of said rigid core, and control means for selectively causing said flexible wall to be contracted into contact with the rigid core and expanded relative to the rigid core, said mandrel being capable, with the flexible wall thereon in its contracted state, of insertion into the hollow mold cavity leaving a clearence between material wound on the mandrel and the cavity wall over the entire periphery of the mandrel.

4,698,012

MULTI-STATION ROTARY BLOW MOLDING MACHINE

Richard K. Shelby, 160 Briarwood N., Oak Brook, Ill. 60521, and Robert G. Nutting, Glenview, Ill. 60025

Filed Sep. 20, 1985, Ser. No. 778,411
Int. Cl.[4] B29C *49/64*
U.S. Cl. 425—526 **28 Claims**



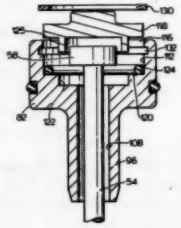
1. A multi-station rotary blow molding machine having a rotary frame and a stationary support frame, comprising
a. a plurality of separable blow molds angularly arranged in a circular array in said mold frame about a central shaft having a central axis, each mold comprising a pair of mold sections each having an internal cavity with the internal cavities of said mold sections, when joined, defining the external configuration of a molded article,
b. means mounting said mold sections in said mold frame for movement toward and away from one another in a direction generally parallel to the axis of said central shaft,
c. means for opening and closing the mold sections of each pair of mold sections, said means for opening and closing including:
i. a toggle having a central pivot attached to said mold frame,
ii. a pivotable arm located between each mold section and each toggle, said arm having a first pivot attached to said mold section and a second pivot attached to one end of said toggle, and in which said toggle is pivotally positionable about said central pivot in one of two orientations, a first orientation at which said second pivot is raised and said mold sections are opened away from one another, and a second orientation at which said second pivot is lowered and said mold sections are closed against one another, said second orientation being an over-the-center orientation such that the center of said second pivot is passed through a line connecting the center of the first pivot and the central pivot when said toggle is pivoted from said first orientation to said second, and
iii. means in said second orientation for urging said mold sections into intimate contact with one another,
d. air distribution means for supplying air for blowing articles and controlling certain portions of the molding machine, said air distribution means including an air supply manifold having means for supplying air for predetermined portions of a revolution of said rotary mold frame,
e. means for cooling each mold section, said cooling means including an internal fluid path in each mold section and means interconnecting the internal paths of adjacent mold sections for passing cooling fluid serially between adjacent mold sections, certain adjacent mold sections being grouped into a cooling circuit and said cooling means including a plurality of said cooling circuits, each cooling circuit including an inlet for fresh cooling fluid and an outlet for expended cooling fluid, and
f. means for rotating said mold frame.

4,698,013

MECHANISM FOR VALVE GATED INJECTION MOLDING WITH RESILIENT RETAINING RING

Robert M. Butcher, Rte. 1, Box 342-B, Fletcher, N.C. 28732

Filed Oct. 20, 1986, Ser. No. 920,779
Int. Cl.[4] B29C *45/20, 45/22*
U.S. Cl. 425—549 **6 Claims**



1. In a valve gated injection molding system having at least one heated nozzle seated in a cavity plate, the nozzle having a central bore in alignment with a gate leading to a cavity, an elongated valve pin having an enlarged driven end and a tip end, the valve pin extending through the central bore of the nozzle with the driven end being operatively connected to a hydraullic valve pin actuating mechanism mounted on a mold back plate whereby the valve pin is reciprocated between a

retracted open position and a closed position wherein the tip end of the valve pin is seated in the gate, and a melt passage extends to convey melt around the valve pin through the central bore of the nozzle to the gate, the improvement wherein;

the valve pin actuating mechanism comprises a piston with a body and a cap, said piston seated in a cylinder with hydraulic fluid lines connected to apply hydraulic pressure to opposite sides of the piston to reciprocate the piston according to a predetermined cycle, the driven end of the valve pin having an enlarged head, the body of the piston having a well with an inner wall and an open mouth to receive the cap therein, the well having a shoulder at the bottom thereof forming a cup leading to a central bore extending through the body of the piston to receive the valve pin therethrough with the head of the valve pin seated in the cup, the inner wall of the well having a groove to receive an inwardly compressible resilient retaining ring which expands into the groove to removably retain the cap between the retaining ring and a compressible circumferential sealing means compressed between the shoulder and the cap, whereby the cap retains the head of the valve pin in the cup to removably connect the driven end of the valve pin to the piston and the compressible sealing means seals against leakage of hydraulic fluid.

4,698,014

METHOD AND APPARATUS FOR THE LOW-WEAR ATOMIZATION OF LIQUID HIGHLY VISCOUS AND/OR SUSPENDED FUEL INTENDED FOR COMBUSTION OR GASIFICATION IN BURNER FLAMES

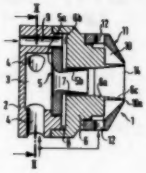
Klaus Grethe, Gummersbach; Heinrich Eickhoff, Rösrath-Kleineichen; Elmar Goller, Troisdorf, and Ralf Hülsen, Leverkusen, all of Fed. Rep. of Germany, assignors to L. & C. Steinmüller GmbH, Gummersbach and Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V., Cologne, both of, Fed. Rep. of Germany

Filed Dec. 23, 1985, Ser. No. 812,184

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3507675; Jul. 13, 1985, 3525161

Int. Cl.[4] F23M *3/00*

U.S. Cl. 431—9 **20 Claims**



1. A method for the combustion or gasification of highly viscous and/or suspended fuel in a burner flame, including introducing said fuel, via an atomizing device including an inlet mechanism communicating with an atomizing medium feed line, said atomizing device being connected to a supply of fuel and also provided with an annular gap for discharge of said fuel and a nozzle having an inner nozzle wall that includes a nozzle head and that surrounds said annular gap formed between an outer wal of the inlet mechanism and said inner nozzle wall and distributing the fuel in the form of a continuous, thin, annular layer, into a stream of atomizing medium, with the aid of which said fuel is atomized; said method comprising the steps of:

providing the inner wall of said nozzle that delimits said annular gap and receives a fuel film therefrom as well as having an extension of said inner wall and said nozzle head having an annular knife-edge configuration therewith;

guiding said fuel onto said inner wall of said nozzle, as a continuous annular film, at a velocity that is low with regard to wear effected thereby;

conveying said stream of atomizing medium within and past said annular film;

atomizing said fuel at said nozzle head and extension of said nozzle wall and particularly approaching in vinicity of said annular knife-edge configuration with a subsonic velocity; and

discharging said fuel, and said atomizing medium stream that flows within said annular fuel film, from said nozzle so as to depart from said annular knife-edge configuration at subsonic velocity.

12. An atomizing device for use with a burner for the combustion or gasification of highly viscous and/or suspended fuel in a burner flame in a combustion chamber; the atomizing device being provided with an inlet mechanism and connected to a supply of fuel, and to at least one atomizing medium line; the atomizing device is also provided with an annular gap for the discharge of said fuel, and an axially symmetrical nozzle that surrounds said annular gap and has a first and second end; said atomizing device further comprises:

an inner nozzle wall that delimits said annular gap formed between an outer wall of the inlet mechanism and said inner nozzle wall and receives a fuel film therefrom;

an annular channel that surrounds said first end of said nozzle and communicates with said annular gap;

at least one fuel supply channel that communicates with said supply of fuel and with said annular channel;

a nozzle section that is provided at said second end of said nozzle, forms an extension of said inner nozzle wall, and has an annular knife-edge configuration; and

a preliminary chamber that communicates via the inlet mechanism with said first end of said nozzle, with said atomizing medium line communicating with said preliminary chamber.

4,698,015

INSTALLATION FOR MONITORING THE FUNCTIONING OF A BOILER

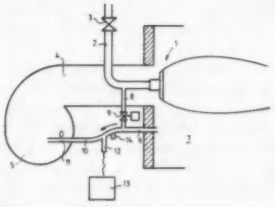
Gérald Brunel, 3, rue Traversière, 42100 Saint Etienne, France

Filed Dec. 29, 1986, Ser. No. 947,388

Claims priority, application France, Dec. 31, 1985, 85 19491

Int. Cl.[4] F23N *5/00*

U.S. Cl. 431—76 **6 Claims**



1. Apparatus for monitoring the quality of combustion in an installation having a combustion chamber, comprising

(1) a smoke sampling duct for drawing off a portion of the smoke emanating from the combustion chamber and causing the smoke to flow through the sampling duct toward a vent,

(2) a probe situated where it is exposed to the smoke flowing through the sampling duct, the probe being sensitive to at least one of the substances in the smoke,

(3) gas supply means having an outlet for discharging gas onto the sampling duct upstream of the probe,

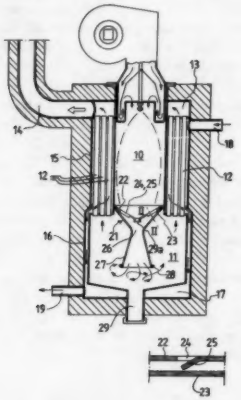
(4) control means for intermittently causing gas from the gas supply means to be discharged into the sampling duct upstream of the probe, and

(5) means connected to the probe for ascertaining the operability of the probe.

4,698,016
GAS TURBULATOR

Nils Östbo, Södra Vägen 24, Göteborg, Sweden (412 54)

PCT No. PCT/SE85/00173, § 371 Date Dec. 10, 1985, § 102(e) Date Dec. 10, 1985, PCT Pub. No. WO85/04947, PCT Pub. Date Nov. 7, 1985
PCT Filed Apr. 15, 1985, Ser. No. 829,130
Claims priority, application Sweden, Apr. 17, 1984, 8402133
Int. Cl.[4] F23M *9/06*
U.S. Cl. 431—171 **5 Claims**



1. Turbulator means located in a passageway from a source of hot gases and comprising:

a member having an upper part including first and second, spaced-apart membrane walls forming between themselves a gas mixing space, and fitted to completely fill said passageway;

said first membrane wall meeting the stream of gases being provided with radial slits each having an oblique wing along at least one of its edges;

said second membrane wall having a central opening, but otherwise having no disruptures; and

an expansion nozzle connected to said opening.

5. A furnace of the kind comprising:

a combustion chamber surrounded by a number of smoke-tubes and connected to a final combustion chamber defined by water-cooled envelope and end walls;

a burner at one end of said combustion chamber and a turbulator means at the opposite end of said combustion chamber; said turbulator means comprising:

turbulator means located in a passageway from a source of hot gases and comprising:

a member having an upper part including first and second, spaced-apart membrane walls forming between themselves a gas mixing space, and fitted to completely fill said passageway,

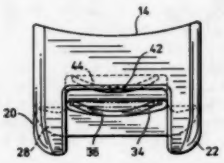
said first membrane wall meeting the stream of gases being provided with radial slits each having an oblique wing along at least one of its edges,

said second membrane wall having a central opening, but otherwise having no disruptures, and an expansion nozzle connected to said opening and reaching a substantial length towards said water-cooled end wall of the final combustion chamber.

4,698,017
ORTHODONTIC BRACKETS

Gustaf H. Hanson, 57 Augusta Street, Hamilton, Ontario, Canada (L8N 1P8)

Filed Dec. 10, 1986, Ser. No. 940,142
Int. Cl.[4] A61C *7/00*
U.S. Cl. 433—11 **12 Claims**



1. An orthodontic bracket comprising:

a bracket body having lingual, labial, gingival, occlusal, distal and mesial surface portions and a mesio-distal extending arch wire receiving slot in the labial surface portion;

a latch member pivoted to the body about a mesio-distal extending pivot axis for movement between a closed position in which it extends in front of the labial mouth of the slot to retain an arch wire therein, and an open position in which an arch wire can be inserted in and withdrawn from the slot by labial or lingual movement thereof respectively;

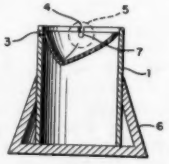
a load spring disposed within the slot adjacent the lingual face thereof for engagement by an arch wire inserted in the slot to urge the arch wire labially against the latch member; and

latch means operative between the bracket body and the latch member for latching the latch member in the said closed position.

4,698,018
COLLECTOR CUP FOR COLLECTING DENTAL AMALGAM

Bernard Nepault, 96 Bis rue Caron, 9100 Athis Mons, France

PCT No. PCT/FR84/00281, § 371 Date Jul. 29, 1985, § 102(e) Date Jul. 29, 1985, PCT Pub. No. WO85/02338, PCT Pub. Date Jun. 6, 1985
PCT Filed Nov. 27, 1984, Ser. No. 763,141
Claims priority, application France, Nov. 29, 1983, 83 18989
Int. Cl.[4] A61C *19/00*
U.S. Cl. 433—25 **9 Claims**



1. A dental material collection apparatus comprising,

a hollow, tubular, cylindrical member of right circular cross section having an internal diameter, diametrically opposed notches at an open end of said tubular member,

means for closing an opposite end of said hollow, tubular, cylindrical member;

a hollow carrier member having a circular open end and an outer surface that does not project beyond a position in which the outer surface would interfere with adjacent walls of said cylindrical member when said hollow carrier member is rotated to an inverted discharge position,

diametrically opposed pivot means at said circular open end of said carrier member adapted to be removably journaled in the said notches of said tubular member for allowing a rotation of said hollow carrier member from a material receiving position to an inverted, discharge position to allow any material within said hollow carrier member to be deposited in said tubular member, and

stop means projecting from said circular open end of said carrier member for engagement with said cylindrical member, for inhibiting a rotation of said carrier member in only one direction to its inverted position.

4,698,019

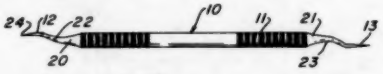
DENTAL INSTRUMENT

James A. Martin, Wieand Rd., P.O. Box 77, Milford Square, Pa. 18935

Continuation-in-part of Ser. No. 663,481, Oct. 22, 1984, abandoned. This application Feb. 20, 1986, Ser. No. 831,321

Int. Cl.⁴ A61C *3/02*

U.S. Cl. 433—144 **7 Claims**



1. A rigid dental instrument used for carving and cleaning teeth and plaster and stone dental casts which comprises:

(1) an elongated handle which can be held and manipulated by a user;

(2) an obliquely disposed first shank which is secured to one end of said handle including a curved inside segment which terminates in a first blade comprised of three linear cutting edges;

(3) an obliquely disposed second shank which is secured to the opposite end of said handle including a curved inside segment which terminates in a second blade comprised of three linear cutting edges;

(4) said first and second blades being comprised of two surfaces which form an angle of from about 40 to 50 degrees, each surface terminating in a cutting edge suitable for dental carving and leading to a pointed tip; and

(5) said first and second blades having a third cutting edge which extends to the point of curvature on the inside portion of said shank immediately above said surface, said cutting edge conforming essentially to the surface of the tooth which is to be operated upon.

4,698,020

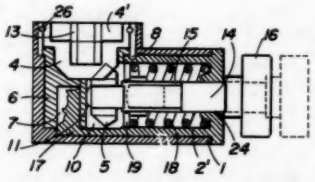
ATTACHMENT FOR A PARTIAL, REMOVABLE, DENTAL PROTHESIS

Ivano Menicacci, Via Goito 57, I-57100 Livorno, Italy

Filed Dec. 6, 1985, Ser. No. 806,279

Int. Cl.⁴ A61C *13/12*

U.S. Cl. 433—177 **10 Claims**



1. An attachment for a partial removable dental prosthesis comprising, a first coulisse for incorporation into the prosthesis, a second coulisse to be fixed to a pillar tooth, a cylindrical body mounted for movement to said first coulisse with respect to a first axis, a retention element mounted for movement to said first coulisse with respect to a second axis lying at an angle to said first axis, and interposed means operatively connecting said retention element to said cylindrical body so that movement of said cylindrical body with respect to said first axis causes movement of said retention element with respect to said second axis, said retention element having a head for frictional engagement with said second coulisse, said interposed means applying a resilient force against said retention element for continuously and adjustably changing the frictional engagement of said head against said coulisse with movement of said cylindrical body along said first axis.

4,698,021

METAL FOIL FOR FORMING A DENTAL COPING AND CROWN

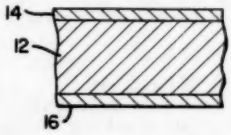
Itzhak Shoher, 50 Shlomo-Hamelech St., Tel-Aviv, Israel (64386), and Aharon E. Whiteman, 13 J.L. Perez St., Petach-Tikvah, Israel (49206)

Continuation-in-part of Ser. No. 690,650, Jan. 11, 1985, abandoned. This application Nov. 29, 1985, Ser. No. 802,987

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.⁴ A61C *5/08*

U.S. Cl. 433—222.1 **11 Claims**



1. A metal foil for use in forming a dental coping for a dental restoration comprising a high fusing temperature layer substantially composed of a precious metal palladium-gold alloy and at least two precious metal layers equally composed substantially or entirely of gold symmetrically disposed about said palladium-gold alloy layer.

4,698,022

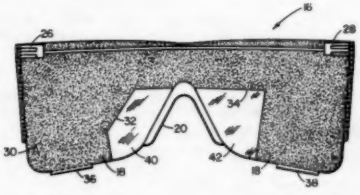
VISUAL OCCULSION APPARATUS FOR PILOT TRAINING

Richard D. Gilson, Columbus, Ohio, assignor to Foggles, Inc., Columbus, Ohio

Filed Jun. 11, 1981, Ser. No. 272,539

Int. Cl.⁴ G09B *9/00*

U.S. Cl. 434—36 **10 Claims**



1. Visual occlusion apparatus for selectively occluding the vision of a pilot during training procedures wherein the pilot is seated at a command position next to oppositely disposed side viewing windows and before a windscreen extending upwardly from a periphery defining cowling region, comprising:

spectacle means including a principal lens region having a right eye lens region and a left eye lens region, each of

predetermined area extent, means defining a frame having a forward support region nestable over the upper nose region of said pilot for positioning said lens region before the eyes of said pilot and two earpiece components mutually spaced, pivotally coupled at the opposite, outwardly disposed peripheries of said lens region and each being extensible over an ear of said pilot, each said earpiece component including a translucent mask extending rearwardly from adjacency with said frame for occluding lines of sight representing peripheral vision of said pilot, said right and left eye lens regions predetermined area extent being effective for intercepting all substantially forward vision of said pilot when positioned before the eyes thereof; and

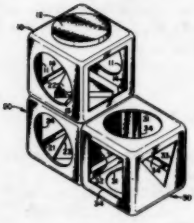
occlusion means at said lens region and having border defined area extent for selectively occluding the vision of said pilot for lines of sight in visual space extending from the eyes of said pilot through said windscreen and effecting unrestricted lines of sight in visual space extending below said periphery defining cowling region, the laterally disposed said border with respect to said right eye lens region being substantially defined by lines of sight between said pilot's right eye and the forwardmost region of the right said side window, the laterally disposed said border with respect to said left eye lens region being substantially defined by lines of sight between said pilot's left eye and the forwardmost region of the left said side window, and said select occlusion being effected as a translucency diffusing light through said right and left eye lens regions to an extent selected to diffusely restrict the sight of said pilot with respect to a predetermined visibility distance.

4,698,023

CONNECTING BLOCKS

Joseph A. Marino, South Ryland Rd., P.O. Box 306, Whitehouse, N.J. 08888

Filed May 1, 1986, Ser. No. 857,975
Int. Cl.[4] G09B *1/36*; A63H *33/08*
U.S. Cl. 434—259 **9 Claims**



1. A toy building block having one side provided with a raised portion and the remaining sides provided with recessed portions, said portions each being of one of three different shapes, and there being at least one recessed portion of each of said three different shapes wherein the side of said block opposing said side having said raised shape portion has a recessed shape portion, said recessed shape portion being the only representative of said shape on any side of said block.

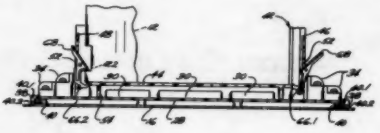
4,698,024

RACK FOR INPUT/OUTPUT MODULES FOR A PROGRAMMABLE CONTROLLER

James W. Maxwell, Johnson City, Tenn., assignor to Texas Instrument Incorporated, Dallas, Tex.

Filed Mar. 1, 1982, Ser. No. 353,766
Int. Cl.[4] H01R *9/09, 13/629*
U.S. Cl. 439—62 **8 Claims**

5. A rack for use in detachably electrically connecting a plurality of electronic modules to an electronic equipment comprising a base, circuit board means having circuit path means thereon mounted on the base, a plurality of first connector means mounted on the circuit board means for use in detachably electrically connecting individual electronic modules to the circuit path means, second connector means provided on the circuit board means for use in electrically connecting the circuit path means to an electronic equipment, a rack member of a stiffly resilient electrically insulating material having a bottom mounted on the base over the circuit board means and having apertures thereon permitting access to the first connector means on the circuit board means, the rack member having a pair of integral side walls upstanding from the bottom in spaced juxtaposed relation to each other to engage respective lateral edges of individual modules which are mounted on the rack by being inserted between said side walls, the side walls have guides spaced therealong so that a pair of guides on each side wall engages each individual module inserted into the rack member at the respective opposite lateral edges of the module to guide the modules into compact side-by-side relation to each



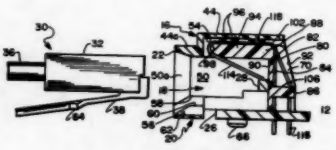
other within the rack member in detachable electrical connection with respective first connector means on the circuit board, the side walls having an opening therein between each of said pairs of guides, pivot means provided on the rack member adjacent each of said openings, and a plurality of latch elements each having a lever, a latch arm, a control arm and a pivot surface releasably positioned in the respective side wall openings, each latch element being arranged in an opening to dispose its pivot surface to bear releasably against said pivot means on the rack member adjacent the opening, to dispose its lever to be engaged by a first end of a module being guided into the rack member by the guides at either side of the opening for pivoting the element against said pivot means as the module is detachably connected to a first connector means on the circuit board means to releasably engage the latch arm in latching engagement with the module as the element is pivoted for firmly holding the module in said detachable electrical connection, and to position the control arm to be manually moved when desired for rejecting the module from the rack member.

4,698,025

LOW PROFILE MODULAR PHONE JACK ASSEMBLY

Raymond A. Silbernagel, and Gordon W. Funck, both of Naperville, Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Sep. 15, 1986, Ser. No. 907,699
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—79 **6 Claims**



1. A right angle modular phone jack arrangement of the type that is mounted on an upper surface of a printed circuit board, said jack including:

housing means having a forward mating end, a rearward end and a modular plug-receiving socket being defined by a plug-receiving opening formed in the forward mating end

with a lower latch-receiving region, a pair of opposed sidewalls joined by a top wall extending from said plug-receiving opening to join a back surface within said housing;

a plurality of metallic elongated conductors mounted to said housing, each conductor including a contact portion at one end extending from said forward end diagonally into the socket, a lead portion at the other end and an intermediate portion between said contact portion and lead portion; and

means for attaching said housing means to said printed circuit board;

the improvement comprising:

said housing means cooperating with the printed circuit board surface to define said socket whereby the upper surface of the printed circuit board disposed generally below said housing means forms a bottom wall of the socket;

said housing means being mounted on said printed circuit board so that the forward mating end extends beyond an edge thereof; and

said forward mating end being offset downwardly relative to the remaining portion of the housing means so that the lower latch-receiving region of the plug-receiving opening is below the upper surface of the printed circuit board.

4,698,026

TERMINAL CONNECTION PIN FOR SOLDERLESS CONNECTIONS

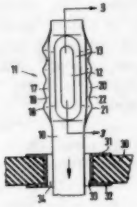
Helmut Rolf, Feucht, Fed. Rep. of Germany, assignor to Leonhardy GmbH, Fed. Rep. of Germany

Filed Oct. 17, 1986, Ser. No. 920,524

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1985, 3537164

Int. Cl.[4] H01R *13/428*

U.S. Cl. 439—82 **10 Claims**



1. Terminal connection pin for solderless connections comprising a generally rectangular pin with an enlarged press-fit section which is insertable into a contact through bore in a printed circuit board, said press-fit section providing a solderless electrical and mechanical connection by contact paths between said terminal connection pin and said contact through bore of said printed circuit board, said press-fit section having a central groove parallel to its longitudinal axis, and providing at least two said contact paths opposite one another and having a limited flexibility, characterized in that said press-fit section **(11)** has lateral areas and a rear area with respect to said groove **(12)**, said lateral areas and said rear area surrounding said groove on three sides, and that said lateral and rear areas have undulations forming peaks **(15, 18, 21)** and valleys **(16, 19, 22)** in an axial direction, said peaks **(18, 21)** of said lateral areas providing said contact paths and the distance between said peaks **(15, 18, 21)** corresponding to half the thickness of said printed circuit board **(30)**, and said peaks **(15)** of said rear area **(14)** are aligned with said valleys **(19, 22)** of said lateral areas and said valleys **(16)** of said rear area **(14)** are aligned with said peaks **(18, 21)** of said lateral areas.

4,698,027

MOISTURE-PROOF ELECTRICAL CONNECTOR

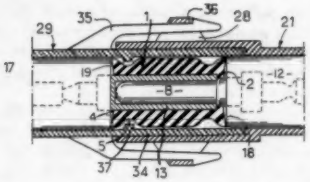
Bertrand Vandame, Villepreux, France, assignor to Precision Mecanique Labinal, Bois d'Arcy, France

Filed May 20, 1986, Ser. No. 865,018

Claims priority, application France, May 21, 1985, 8507630

Int. Cl.[4] H01R *13/52*

U.S. Cl. 439—271 **23 Claims**



1. An electrical connector for providing a moisture-proof electrical connection between at least two connecting elements, said connector comprising a male member and a female member adapted to receive said male member, each of said members being attached to an electrical conductor and being further attached to a unit having a bearing surface, the bearing surfaces of each of said units being adapted to turn with respect to each other, said apparatus further comprising means for retaining said male and female members in an engaged condition, wherein said connector further comprises an elastic, pliable fluid-tight component, said component having at least one axial bore extending there-through, said bore adapted to be engaged about an exterior surface of said female member, said component having first and second concave ends, each of said concave ends forming a substantially cup-shaped surface, said first and second ends of said component being adapted to abut said bearing surfaces of said units when a predetermined compression is exerted on said component.

4,698,028

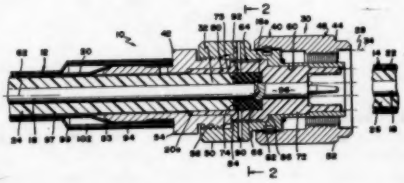
COAXIAL CABLE CONNECTOR

Edward R. Caro, Monterey Park, and Walter J. Bonazza, La Canada, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 8, 1986, Ser. No. 904,513

Int. Cl.[4] H01R *13/52*

U.S. Cl. 439—271 **6 Claims**



1. A connector apparatus useful to connect the end of a coaxial cable to another connector apparatus, comprising:

a coaxial cable having center and outer conductors and a cable insulator between them;

an electrically conductive housing having rear and front ends and forming a passage between its ends, said rear end constructed to mechanically and electrically connect to the outer conductor at the end of said coaxial cable;

an electrically conductive center connector conductor having a rear end for connecting to the center conductor of said coaxial cable;

a connector insulator lying within said passage, and having a

hole through which said center connector conductor extends at least partially;

said connector insulator including an elastomeric portion positioned to be compressed by the cable insulator of said coaxial cable, whereby to avoid gaps arising from axial shrinkage of said insulator of said coaxial cable;

said cable insulator has an end portion that projects forwardly beyond said cable outer conductor, and said elastomeric insulator portion comprises an elastomeric first insulator part which abuts the projecting end portion of said cable insulator, the rearward portion of said passage having a greater width than the outside of said cable insulator end portion and the outside of said elastomeric insulator part; and

said connector insulator includes a second insulator portion lying in said passage, and having a rear portion that extends around both said elastomeric first insulator part and at least part of the projecting end of said cable insulator.

4,698,029

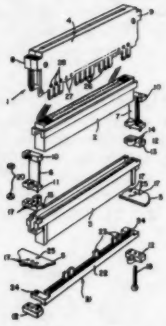
EURO CONNECTOR WITH SPACE ARRANGEMENT TO PERMIT MOUNTING OF MALE AND FEMALE CONNECTORS

Robert G. O'Connor, Greene, N.Y., assignor to General Electric Co., Schenectady, N.Y.

Filed Aug. 1, 1986, Ser. No. 893,052

Int. Cl.[4] H01R *13/645*

U.S. Cl. 439—532 **2 Claims**



1. A connector assembly including:

(a) a housing for retaining different sized male and female connectors,

(b) at least one connector secured in said housing for retaining connector cables,

(c) supporting elements attached to said housing and adapted to be mounted on a chassis, said supporting elements including alignment pins on the side facing a chassis and aligned with mounting holes on said chassis, when a connector of one height is mounted in said housing,

(d) a spacer element for mating with said support element and a chassis when a connector of a different size is mounted in said housing, said spacer element having openings on one side thereof aligned with and adapted to receive the alignment pins on said support element and having alignment pins on the other side thereof aligned with mounting holes in the chassis.

4,698,030

CONNECTOR HAVING ROTATABLE INSERT FOR RETAINING TERMINALS

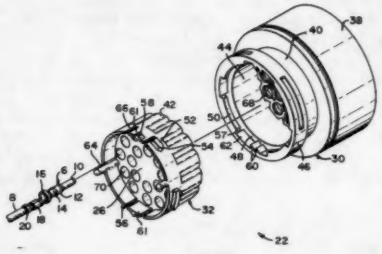
Jurgen H. Ryll, Egelsbach, and Rainer W. Ullrich, Dreieich-Offenthal, both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 13, 1986, Ser. No. 839,306

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1985, 8508465

Int. Cl.[4] H01R *13/502*

U.S. Cl. 439—752 **11 Claims**



1. A multicontact electrical connector of the type comprising a housing assembly having a mating face, a wire entry face, and a longitudinal axis which extends through the housing assembly, the housing assembly comprising first and second aligned housing sections, the first section having the mating face thereon, the second section having the wire entry face thereon, a plurality of terminal receiving cavities extending through the housing assembly and parallel to the longitudinal axis, each cavity having a first cavity portion which is in the first section and a second cavity portion which is in the second section, the first and second housing sections being movable relative to each other in a plane which is perpendicular to the longitudinal axis between a terminal receiving position and a terminal retaining position, the first and second cavity portions being aligned when the first and second housing sections are in terminal receiving positions so that terminals can be inserted into the cavities, the first and second cavity portions being misaligned when the first and second sections are in the terminal retaining positions so that inserted terminals will be retained in the cavities, wherein;

the first and second housing sections have first and second internal faces which are opposed to each other,

one of the housing sections having a hood which surrounds, and extends from its internal face, the other housing section being contained in, and surrounded by, the hood, a locking system being provided for locking the housing sections in their terminal retaining positions and comprising radially extending locking teeth on said hood and on said peripheral surface, the teeth on the hood being interengageable with those on said peripheral surface,

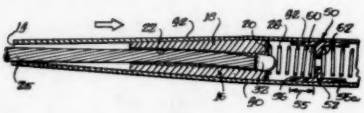
the hood having an internal hood surface and the other housing section having a peripheral surface which is opposed to, and substantially against the internal hood surface, the peripheral surface and the internal hood surface having guiding portions for guiding the sections during movement between the terminal receiving and terminal retaining positions, said teeth on one of the housing sections being provided on flexible arms thereon.

4,698,031

CENTER BARRIER FOR WIRE GRIPPING DEVICES

Robert H. Dawson, Lake Bluff, Ill., assignor to Reliance Electric Company, Cleveland, Ohio

Filed Aug. 11, 1986, Ser. No. 895,052
Int. Cl.[4] H01R *4/50*
U.S. Cl. 439—863 **8 Claims**



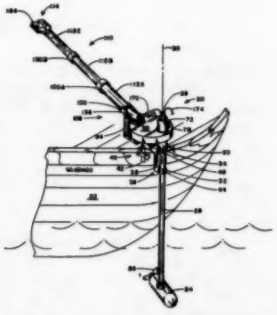
1. A wire gripping device of the type wherein a tapered jaw assembly is slidably mounted within an elongate, tapered, tubular shell defining an axis and having an opening at one axial end thereof, wherein a pilot cup is disposed in said end opening for surroundingly engaging a terminal end of a cable to be introduced into the gripping device to be grippingly engaged by said jaw assembly therewithin, and further having a compression spring having one end thereof in engagement with an end surface of the tapered jaw assembly at an end thereof opposite said shell end opening; and a fixed barrier member disposed in said shell at a position axially spaced from said end opening thereof by a predetermined amount at least as great as the combined axial length of the jaw assembly and the compression spring when the latter is in a fully extended condition; said barrier member comprising an end abutment surface portion for abutting an end of said spring opposite its engagement with said jaw assembly and for abutting said pilot cup and thereby defining full advancement thereof relative to said shell, and a stop portion projecting from said end abutment portion in the direction of said jaw assembly for providing a stop surface for said jaw assembly and for defining a maximum inward travel thereof relative to said shell; the axial extent of said stop portion being sufficient to leave a predetermined minimum axial distance intermediate the jaw assembly end surface and the abutment surface portion greater than the axial length of the pilot cup to thereby facilitate passage of the pilot cup completely through the jaw assembly upon insertion and advancement of a cable into the gripping device.

4,698,032

CONTROL UNIT FOR OUTBOARD MARINE MOTOR ASSEMBLY

David A. Hill, 9547 Old Creek Dr., Fairfax, Va. 22032

Filed Jun. 4, 1984, Ser. No. 616,758
Int. Cl.[4] B63H *5/12*
U.S. Cl. 440—6 **22 Claims**



1. A control unit for use in combination with an outboard marine motor assembly, said outboard marine motor assembly having propulsion means and a power unit for driving said propulsion means, said power unit being connected to a lower end of rotatable shaft means, said rotatable shaft means being securable at an intermediate point thereof to a marine craft by clamping means, said control unit comprising:

first gearing means mounted concentrically about said rotatable shaft proximate the upper end of said shaft;

second gearing means adapted to engage said first gearing means, said second gearing means being configured whereby an angular displacement of said second gearing means results in a greater angular displacement of said first gearing means and said shaft;

handle means, said handle means comprising a plurality of telescoping sections, each of said telescoping sections being essentially hollow for selectively accommodating other of said telescoping sections and electrical conductor means, said handle means further comprising handle grip means at a distal end of the furtherest extendable of said telescoping sections, said handle grip means having electrical switch means thereon, said electrical switch means being connected to said electrical conductor means; and,

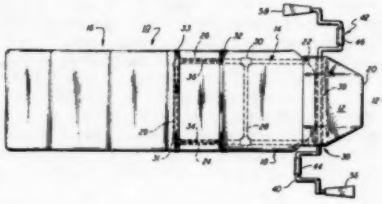
means for connecting said handle means to said second gearing means, said means for connecting said handle means to said second gearing means including means for selectively orienting the axis of said handle means at acute angles with respect to a plane in which said second gearing means lies, and wherein said means for connecting said handle means to said second gearing means has a hollow internal passageway through which said electrical conductor means extends.

4,698,033

RECREATIONAL WATERCRAFT

Shirl F. Hall, 3585 Jefferson Rd., Ashtabula, Ohio 44004

Filed May 30, 1986, Ser. No. 868,758
Int. Cl.[4] A63B *35/04*
U.S. Cl. 440—27 **15 Claims**



1. A manually propelled watercraft for supporting a rider in a prone position, said watercraft comprising:

a forwardly disposed rigid nose portion;

frame means attached to said nose portion and extending longitudinally rearwardly from said nose portion, said frame means terminating in a rearward end portion;

an inflatable body portion mounted on said frame means, and extending rearwardly beyond the rearward end portion of said frame means to render said body portion flexible;

fastening means securing said body portion to said frame means;

a paddle assembly mounted in said nose portion, said paddle assembly including:

shaft means rotatably mounted in said nose portion and extending in a traverse direction;

crank means at opposite end sections of said shaft means, said crank means having an arc of rotation, and a nose portion extending forwardly of said crank means and below said arc of rotation; and

paddle means attached to said shaft means;

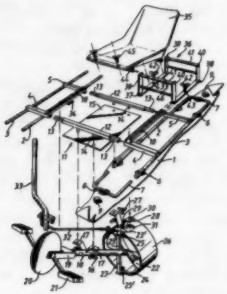
said crank means being graspable by a rider lying prone on the watercraft and rotatable to rotate said shaft means and said paddle means to propel the watercraft in water.

4,698,034

WATER BICYCLE

Edwin M. C. Anthonijsz, Eindhoven, Netherlands, assignor to N.V. Lighttown Constructions, Eindhoven, Netherlands

Filed Jul. 10, 1985, Ser. No. 753,640
Int. Cl.[4] B63H *16/18*
U.S. Cl. 440—27 **8 Claims**



1. A water bicycle comprising:

two relatively parallel, elongate floating bodies;

a frame supported by said floating bodies such that each of the floating bodies is provided with a frame part supported by the associated floating body and each frame part includes a first guide for receiving a second guide;

a spacing member releasably arranged between the two frame parts for maintaining the frame parts and the floating bodies connected thereto at a given distance from one another, wherein each frame part arranged on a floating body is provided with two hollow frame beams at right angles to the longitudinal direction of the floating body and the spacing member is provided with spacer frame beams extending in line with said hollow frame beams, the ends of said spacer frame beams being thinner than the center portions of said spacer frame beams, the thinner ends of said spacer frame beams being inserted into corresponding ends of said hollow frame beams;

a seat being supported by an auxiliary frame provided with two second guides for cooperating with the two first guides forming part of the frame parts on the floating bodies so that in the longitudinal direction of the floating bodies the second guides are secured to but slidable relative to the first guides; and

means for fixing the second guides in a desired position relative to the first guides;

wherein said auxiliary frame holds said two relatively parallel elongated floating bodies to be no more than said given distance apart when said second guides are fixed relative to said first guides.

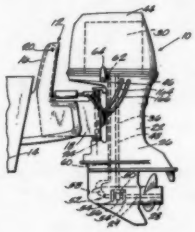
4,698,035

MARINE PROPULSION DEVICE HYDRAULIC SYSTEM

Arthur R. Ferguson, Northbrook, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation-in-part of Ser. No. 752,362, Jul. 3, 1985, and a continuation-in-part of Ser. No. 710,494, Mar. 11, 1985, which is a continuation-in-part of Ser. No. 614,821, May 29, 1984, and a continuation-in-part of Ser. No. 614,815, May 29, 1984, Pat. No. 4,592,732, which is a continuation-in-part of Ser. No. 605,141, Apr. 30, 1984, Pat. No. 4,545,770, which is a continuation-in-part of Ser. No. 293,324, Aug. 17, 1981, Pat. No. 4,449,945. This application Sep. 25, 1985, Ser. No. 779,478
Int. Cl.[4] B63H *25/42*
U.S. Cl. 440—61 **35 Claims**

1. A marine propulsion device comprising a propulsion unit adapted to be pivotally mounted on the transom of a boat for pivotal movement relative to the transom about a steering axis, said propulsion unit including a rotatably mounted propeller, an engine including throttle means, and a shiftable transmission drivingly connecting said engine to said propeller and including shift means, hydraulic shift assist means connected to said shift means for actuation thereof, hydraulic throttle assist means connected to said throttle means for actuation thereof, a hydraulic fluid reservoir, a pump communicating with said reservoir, supply conduit means communicating between said



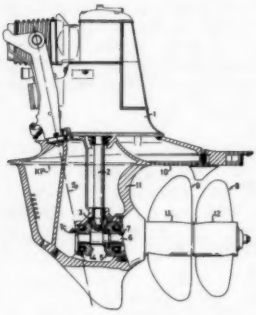
pump and one of said throttle assist means and said shift assist means, supply conduit means communicating between said one of said throttle assist means and said shift assist means and the other of said throttle assist means and said shift assist means, and return conduit means communicating between said other of said throttle assist means and said shift assist means and said reservoir.

4,698,036

PROPELLER DRIVE FOR BOATS

Lennart H. Brandt, Fjäras, Sweden, assignor to AB Volvo Penta, Gothenburg, Sweden

Continuation of Ser. No. 531,613, Sep. 12, 1983, abandoned. This application Sep. 20, 1985, Ser. No. 778,310
Claims priority, application Sweden, Sep. 13, 1982, 8205215
Int. Cl.[4] B63H *5/12*
U.S. Cl. 440—62 **2 Claims**



1. In a propeller drive unit for boats having conventional cable steering to steer same and a pair of concentric counter-rotationally driven propeller shafts in a drive housing, each of said shafts carrying at least one propeller having a hub, said drive housing having a substantially vertical output drive shaft extending generally the length of said housing and having its lower end coupled to said pair of shafts, and a steering axis inclined with respect to said drive shaft for steering said drive housing thereabout, and an anti-cavitation plate located above said propellers, the improvement comprising said drive housing including a forward projected surface located beneath a first plate generally and horizontally defined by said anti-cavitation plate and forwardly of a second plane passing generally laterally through said first plane and through and along said steering axis, said forward projected surface being at least half but at most twice as large as the rearward projected surface of the portion of the drive housing located below said first plane

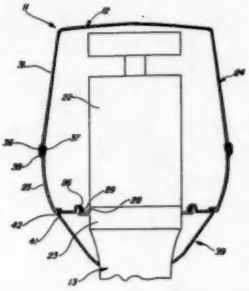
and behind said second plane and the projected surface of said hubs of said propellers to locate a pressure center of flow force of water on said drive unit forwardly of said steering axis thereby reducing the resultant steering torque exerted by the water flow force on said drive unit counteracting against the transverse forces of said propellers and permitting use of conventional cable steering to steer said drive unit about said steering axis.

4,698,037

PROTECTIVE COWLING ARRANGEMENT FOR OUTBOARD MOTOR

Eifu Watanabe, and Toshiyuki Yamazaki, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Japan

Filed Mar. 28, 1986, Ser. No. 845,596
Claims priority, application Japan, Apr. 4, 1985, 60-70042
Int. Cl.[4] B63H *21/00*
U.S. Cl. 440—78 **7 Claims**



1. An outboard motor construction comprising a drive shaft housing having an outer peripheral surface, an internal combustion engine supported by a supporting element at the upper end of said drive shaft housing, and a protective cowling encircling said engine and the upper end of said drive shaft housing, said protective cowling comprising a tray portion disposed at least in part beneath said engine, an upper cowling portion affixed to said tray portion, encircling and enclosing said engine and sealingly engaged with said tray portion around its periphery and a skirt portion surrounding said drive shaft housing around its periphery, affixed directly to said drive shaft housing independently of said tray portion and carrying means sealingly engaged with said tray portion around its periphery, said skirt portion being removable from said drive shaft housing without removal of either of said tray portions or said upper cowling portion.

4,698,038

VESSEL MOORING SYSTEM AND METHOD FOR ITS INSTALLATION

Joe W. Key, Magnolia, and Fred E. Shumaker, Houston, both of Tex., assignors to Key Ocean Services, Inc., Magnolia, Tex.

Filed Oct. 17, 1984, Ser. No. 661,690
Int. Cl.[4] E21B *43/01*
U.S. Cl. 441—5 **17 Claims**

1. A method of installing a mooring system in newly constructed vessels and retrofitting into existing vessels, said vessels having unitary bow and stern sections comprising:

installing a vertical well extending from the deck of the vessel to the bottom plates of the vessel, the ratio of the opening of the well to the width of the deck adjacent said well being in the range of about 1:5 to 1:10;

connecting a lower bearing ring to the underside of said bottom plates said lower bearing ring circumscribing said well;

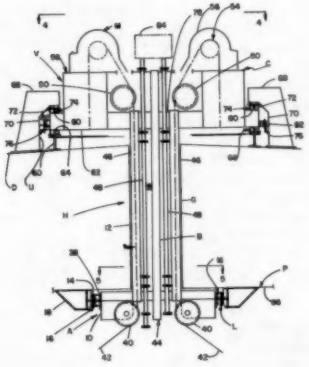
supporting a lower turret unit substantially within said lower bearing ring, said lower turret unit having an annular shape with a larger cross-sectional area, in a plane perpendicular to the longitudinal axis of said well, than said well;

placing a middle turret unit substantially within said well;

connecting said middle turret unit to said lower turret unit;

connecting an upper bearing ring to the top of the deck said upperbearing ring circumscribing said well; and

connecting an upper turret unit to said middle turret unit, said upper turret unit having an annular shape with a



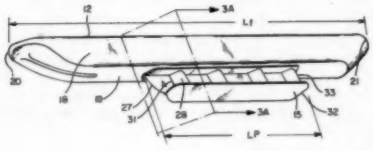
larger cross-sectional area, in a plane perpendicular to the longitudinal axis of said well, than said well, said upper turret unit supported and guided by said upper bearing ring, whereupon the assembly of said upper, middle, and lower turret units is supported and guided by said interaction between said upper bearing ring and said upper turret unit, and said assembly is further guided by said lower bearing ring, for continuous mooring of the entire vessel in seas having wave heights which could be as great as ninety to one-hundred feet.

4,698,039

APPARATUS FOR WALKING ON WATER OR LAND

Benjamin H. Watson, 2601 NE. 4th St., #622, Renton, Wash. 98056

Filed Oct. 24, 1986, Ser. No. 922,674
Int. Cl.[4] A63C *9/32*
U.S. Cl. 441—77 **2 Claims**



1. Apparatus for walking on water or land, comprising two essentially identical assemblies, each assembly comprising:

a float and

a propulsion apparatus,

said floating having:

a top,

a bottom having a flat portion,

a first longitudinal axis,

a first length,

a first forward end,

a first aft end, and

a footwell set into said top and extending to said bottom,

said footwell located symmetrically relative to said first longitudinal axis and having a forward end located at a distance in the range of 50% to 60% of said first length from said first forward end,

said propulsion apparatus comprising:

an I beam, a plurality of flaps and a plurality of hinge apparatuses, one for each of said flaps of said plurality of flaps, each of said hinge apparatuses having a deflection limiting means and an effective hinge axis,

said I beam having:

a top flange,

a bottom flange, said top and bottom flanges being parallel to each other,

a web having a first side and a second side,

a second length,

a second forward end,

a second aft end, and

a second longitudinal axis,

said second length being in the range of 35% to 60% of said first length,

said flanges having first and second edges parallel to said longitudinal axis,

said web joining said flanges midway between said first and second edges,

each of said flaps of said plurality of flaps being essentially rectangular and having

a top edge,

a bottom edge,

a hinge edge,

an outer edge,

a working surface, and

a width between said hinge edge and said outer edge,

each of said flaps being hinged to said web by one of said hinge apparatuses with said effective hinge axis essentially perpendicular to said second longitudinal axis, half of said plurality on said first side, half on said second side, with said hinge edge close to one of said sides, said top edge close to said top flange, said bottom edge close to said bottom flange, said width of each said flaps being such that when said flaps are deflected away from said sides to the extent permitted by said deflection limiting means said outer edges lie essentially in a a first plane intersected by said first edges of said flanges and a second plane intersected by said second edges of said flanges and said working surfaces are at an acute angle to said sides, said angle being in the range of 80° to 89°,

said flaps being positioned equidistant from each other in two series, one series on each of said sides, along said second length, the first in each of said two series having said hinge edges near said second forward end and the last in each of said two series having said outer edges at said second aft end when said flaps are hinged to positions in which said working surfaces are close to and essentially parallel to said sides,

said top flange being fastened to said flat portion of said bottom with said first and second longitudinal axes essentially parallel and said second forward end positioned a distance X from said first forward end, said distance X being in the range of 20 to 30 percent of said first length.

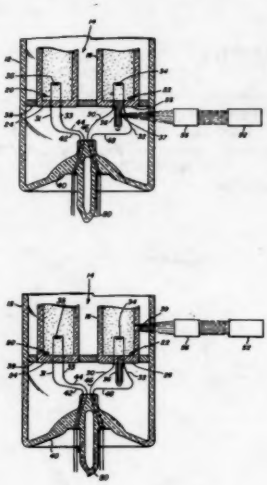
4,698,040

METHOD OF MAKING ARC DISCHARGE LAMPS

Andre C. Bouchard, Peabody, and Paul A. Thibault, Danvers, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Oct. 22, 1986, Ser. No. 921,308
Int. Cl.[4] H01J *9/24*
U.S. Cl. 445—26 **10 Claims**

1. In a method of making a fluorescent lamp the steps comprising: forming an inner lamp assembly including at least one section of phosphor coated tubing, said tubing having end closing means mounting electrodes within said tubing, said inner lamp assembly having an exhaust tubulation projecting therefrom; exhausting said inner lamp assembly tubing through said exhaust tubulation; filling said inner lamp assembly tubing with an arc generating and sustaining atmosphere including mercury through said exhaust tubulation; sealing said exhaust tubulation to hermetically seal said inner lamp assembly tubing; mounting said inner lamp assembly within a jacket formed from glass transparent to a given range of radiation, said jacket also having an exhaust tubulation; exhausting said jacket



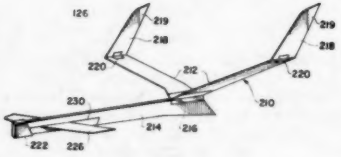
through the jacket exhaust tubulation; filling said jacket with an arc generating and sustaining atmosphere including mercury through the jacket exhaust tubulation; sealing said jacket exhaust tubulation to hermetically seal said jacket; and directing focused, coherent radiation through said jacket upon said inner lamp assembly tubing or exhaust tubulation to cause an opening therein, whereby fluid communication is enabled between the inner lamp assembly tubing and jacket.

4,698,041

MULTIPLE CONFIGURATION MODEL AIRCRAFT

Madhava Dasa, R.R. 1 - Box 549, Kula, Hi. 96790

Filed Aug. 5, 1985, Ser. No. 762,295
Int. Cl.[4] A63H *27/18*
U.S. Cl. 446—61 **1 Claim**



1. A model aircraft kit including constituent parts which are adapted to be assembled together in connected relationship in differing model aircraft configurations providing correspondingly different model aircraft appearances and aerodynamic characteristics, comprising:

fuselage members, at least one of said fuselage members comprising a body including means by which some of said parts can be assembled thereto, comprising slots, grooves, notches, and surfaces thereon and therein in combination serving as releasable supports for at least some of said

parts, said one fuselage member thereby being adapted for supporting other of said constituent parts, said one fuselage member further comprising at least two unitary subparts, each having means adapting it to be detachably joined to the other anyone of said subparts being adapted to function, when detached, as a separate fuselage in one of said configurations;

a plurality of plane surface members for providing differing planforms for said configurations, each of said plurality of plane surface members being adapted to be generally supported by at least one of said fuselage members, at least some of said plurality of plane surface members being adapted to support another of said plurality of plane surface members; and

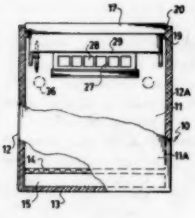
connector means for connecting at least some of said plurality of plane surface members to at least some of said fuselage members at differing positions and for connecting one or more of said plurality of plane surface members to another one of said plurality of plane surface members.

4,698,042

STORAGE BOX FOR BOAT

Jim Rubin, Box 907, Weyburn, Saskatchewan, Canada S4H 2L2

Filed Aug. 15, 1986, Ser. No. 896,819
Int. Cl.[4] A63H *23/00*
U.S. Cl. 446—75 **16 Claims**



1. A storage container and boat combination comprising an open-topped container and a cover therefore, said cover detachably engaging within the open upper end of the container, means cooperating between the cover panel and the walls of the container to receive and retain said cover in position, said cover forming part of the hull of a boat depending from the underside of said cover and into said container when said cover is engaged within the open upper end of the container.

4,698,043

ROLLING EGG TOY

Richard L. May, and Jonathan R. May, both of Manhattan Beach, Calif., assignors to May-Curran Associates, Redondo Beach, Calif.

Filed May 9, 1986, Ser. No. 861,358
Int. Cl.[4] A63H *15/06*
U.S. Cl. 446—273 **4 Claims**

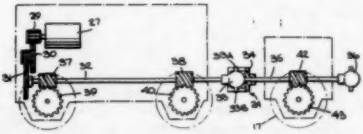
1. A toy having an enclosure formed of two rollable sections movable axially with respect to one another between an open position and a closed position; a figure contained within the enclosure; and a mechanism coupled to the two sections of the enclosure and to the figure to cause the sections to separate and the figure to pop out of the enclosure when the enclosure is rolled along the surface; said mechanism including a latch coupled to the enclosure sections to hold the sections in a closed position, means coupled to the latch to cause the latch to open after a predetermined number of rotations of the enclosure, and a spring connected to the sections to draw the sections apart to the open position when the latch is released.

4,698,044

ARTICULATED TOY VEHICLE

Melvin R. Kennedy, 2 Fifth Ave., New York, N.Y. 10011; Dietmar Nagel, 147 South Rd., Chester, N.J. 07930, and Abraham A. Arad, 6 Minuteman Hill, Westport, Conn. 06880

Filed Apr. 15, 1986, Ser. No. 852,288
Int. Cl.[4] A63H *17/05*
U.S. Cl. 446—434 **5 Claims**



1. An articulated toy vehicle of adjustable length capable of negotiating a terrain having varying contours comprising:

A. a tractor section provided with front and rear wheel axles, and at least first and second trailer sections, each having a wheel axle;

B. a battery-operated motor mounted on said tractor section;

C. A multi-section drive shaft whose first shaft section is mounted for rotation on said tractor section at right angles to the front and rear wheel axles, whose second shaft section is mounted for rotation on said first trailer section at right angles to the wheel axle thereof, and whose third shaft section is mounted for rotation on said second trailer section at right angles to the wheel axle thereof;

D. a snap-fit universal joint detachably coupling the rear end of the first drive shaft section to the front end of the second drive shaft section, thereby linking the tractor section to the first trailer section, and a snap-fit universal joint detachably coupling the rear end of the second drive shaft section to the front end of the third drive shaft section, thereby linking the first trailer section to the second trailer section whereby the tractor section and the first and second trailer sections are capable of assuming a sinuous formation to conform to the varying contours of the terrain;

E. means operatively coupling the motor to the front end of the first section of the drive shaft to cause said first shaft section and the second and third shaft sections coupled thereto to rotate; and

F. means operatively coupling said first shaft section to at least one of said front and rear wheel axles in said tractor section and said second shaft section to the wheel axle in said first trailer section and said third shaft section to the wheel axle in said second trailer section, whereby the vehicle traction is distributed between said tractor section and said first and second trailer sections.

4,698,045

TORSIONAL DAMPER WITH INTERMEDIATE MEMBER FOR RENDERING SPRINGS INOPERATIVE AT LOW TORQUE

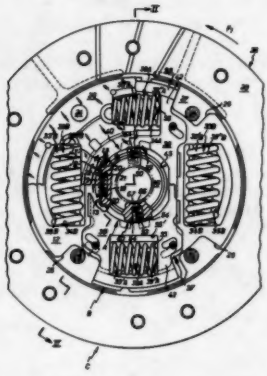
René Billet, Lamorlaye; Paolo Rumignani, Neuilly S/Seine, and Gustave Chasseguet, Taverny, all of France, assignors to Valeo, Paris, France

Filed Jun. 20, 1985, Ser. No. 746,637

Claims priority, application France, Jun. 22, 1984, 84 09853; May 31, 1985, 85 08253

Int. Cl.[4] F16D *13/68;* F16F *15/12*

U.S. Cl. 464—68 30 Claims



1. Torsional damper device of the kind comprising at least three coaxial rotary parts disposed to rotate relative to one another in pairs within defined limits of relative angular movement against circumferentially acting elastic means operative circumferentially between them over part at least of such relative angular movement, said at least three coaxial parts including a hub, at least one transverse annular hub flange and at least one transverse guide ring, said circumferentially acting elastic means comprising first circumferentially acting elastic means operatively disposed between said hub and said hub flange and second circumferentially acting elastic means operatively disposed between said hub flange and said guide ring, said at leat one transverse annular hub flange being disposed around said hub, meshing means with clearance between said hub and said hub flange, said at least one transverse annular guide ring being parallel to said at least one hub flange and disposed around said hub but independent thereof, an intermediate member responsive to centrifugal force disposed to be movable between an inoperative standby position and, when the rotation speed exceeds a critical value, an operative position in which said intermediate member is operative between two of said rotary parts for at least one direction of relative rotation between said two rotary parts to urge in said at least one direction of relative rotation at least part of said circumferentially acting elastic means operative between one of said two rotary parts and a third one of said rotary parts, and return means urging said intermediate member towards its inoperative standby position, the improvement wherein said intermediate member comprises, for the purpose of its operation between said hub flange and said hub, at least one radially mobile flange guided by said hub flange and having a toothed portion through which, in its operative position, said at least one radially mobile flange cooperates with a complementary toothed portion on said hub and which includes a bearing lug through which said at least one radially mobile flange is operative on at least part of said second circumferentially acting elastic means.

4,698,046

TRANSMISSION DEVICE IN PARTICULAR FOR A DRIVING WHEEL OF A MOTOR VEHICLE

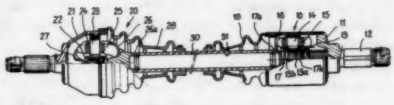
Bernard Poulin, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Continuation of Ser. No. 563,929, Dec. 21, 1983, abandoned. This application Dec. 9, 1985, Ser. No. 805,585

Claims priority, application France, Dec. 24, 1982, 82 21773

Int. Cl.[4] F16D *1/06;* C21D *1/06*

U.S. Cl. 464—115 16 Claims



1. A transmission device for use between an engine unit and front driving wheels of a motor vehicle, said device comprising:

two constant-speed joints, at least a first of said joints including a first element defining raceways for rolling members of said joint, said first element being formed of a high grade steel capable of undergoing a thermochemical treatment imparting to said element a high surface hardness;

a hollow tubular shaft connected to said two joints and including a first end welded to said first element of said first joint, said shaft being formed of a high grade steel capable of undergoing a thermochemical treatment substantially identical to that to which said first element is capable of being subjected and imparting to said shaft a high surface hardness; and

the entire assembly of said first element, said shaft and the weld therebetween being subjected to a cementation or carbonitriding thermochemical treatment followed by quenching, to surface harden said assembly such that surfaces of said assembly, including said weld, have a high surface hardness sufficient to withstand pressures exerted on said raceways by the rolling members of said joint.

4,698,047

ROTARY CONSTANT VELOCITY UNIVERSAL JOINT HAVING TRACKS OF UNIFORM CURVATURE

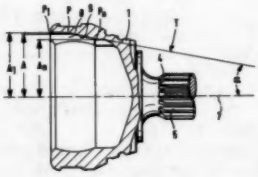
Hans-Heinrich Welschof, Rodenbach, and Joachim Schöneberger, Offenbach am Main, both of Fed. Rep. of Germany, assignors to Löhr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Continuation of Ser. No. 789,924, Oct. 21, 1985, abandoned, which is a continuation of Ser. No. 556,584, Nov. 30, 1983, abandoned. This application Jul. 24, 1986, Ser. No. 890,809

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1982, 3244196

Int. Cl.[4] F16D *3/23*

U.S. Cl. 464—145 8 Claims



1. In a rotary constant velocity universal joint including an outer hollow joint member having an inner face wherein provision is made for running tracks extending in circumferentially spaced planes containing the plane of rotation of the joint member, an inner joint member having an outer face wherein

provision is made for running tracks corresponding to the running tracks in said outer joint members, a hollow cage arranged between said outer and inner joint members having a spherical outer face which, relative to said outer joint member, is guided in a spherical inner face between two adjoining running tracks of the outer joint member and by a spherical inner face on a spherical outer face between two adjoining running tracks of the inner joint member, and wherein said cage in the region of the running tracks has been provided with openings in the form of windows which accommodate rolling members each of which is guided in the corresponding running tracks of said inner and outer joint members, and wherein said running tracks in the inner and outer joint members extend in a curved configuration, the improvement comprising:

that said running tracks are formed with a curvature which represents a copy of the track curve of the centers of said rolling members across the articulation range of said joint, which curvature, starting from a first point at which said curvature of said running tracks is at a greatest distance from the axis of rotation of the respective joint member, extends in such a way that the angle of intersection formed by a tangent at said curvature and the axis of rotation of the respective joint member increases constantly;

that said curvature of said running tracks is a continuous curve extending over the entire extent of said running tracks and defined by differing radii gradually decreasing from a maximum radius at said first point to a minimum radius in accordance with a uniform mathematical function; and

that within an articulation range of 0° to approximately 10°, the angle of intersection is 7° to 10°.

4,698,048

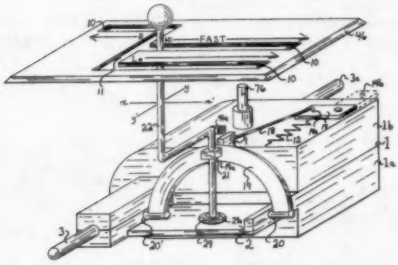
VARIABLE SPEED TRACTOR TRANSMISSION AND SINGLE LEVER CONTROL

Kenneth P. Rundle, 8304 Brookside Rd., Independence, Ohio 44131

Continuation-in-part of Ser. No. 723,650, Apr. 16, 1985, abandoned. This application Apr. 4, 1986, Ser. No. 848,228

Int. Cl.[4] F16H *11/04*

U.S. Cl. 474—27 **4 Claims**



1. A drive mechanism for a small tractor and the like comprised of the combination of a variable speed ratio V-belt transmission and a forward and reverse gear transmission, said transmissions both being controlled by a single shift lever movable within a gate means generally parallel to the longitudinal axis of said tractor to control said V-belt transmission and movable within said gate means on a second axis generally perpendicular to said longitudinal axis to control said gear transmission, wherein a progressive forward movement of said lever from a neutral non driving position will establish and then advance said speed ratio of said V-belt transmission when said gear transmission is shifted to a forward travel drive, and wherein a progressive rearward movement of said lever from said neutral position will establish and then advance said speed ratio of said V-belt transmission when said gear transmission is shifted to a reverse travel drive, wherein said V-belt transmission comprises an intangible reference centerline on a reference plane, said centerline extending generally parallel to said longitudinal axis, and a driver sheave disposed forward generally on said centerline fixedly carried on the crankshaft of an engine, said crankshaft having an axis of rotation perpendicular to said reference plane, and a driven sheave disposed rearward generally on said centerline fixedly carried on the input shaft of said gear transmission, said input shaft having an axis of rotation perpendicular to said reference plane, and a double sheave variator comprised of a first sheave and a second sheave separated by a common center flange movable axially to alter the pitch diameters of said first and second sheaves in inverse proportion, said variator being disposed between said driver and driven sheaves and generally on said centerline when said V-belt transmission is in a neutral non driving state, and a generally stationary pivot mounting, and a carrier member having a spindle axle extending perpendicular to said reference plane and having a connection to said pivot mounting to permit movement of said spindle axle parallel to said reference plane and generally following an arc, said arc having a radius generally equal to the distance between said spindle axle and said pivot mounting, said variator being rotatably carried on said spindle axle, and a first friction drive V-belt reeved about said driver and first sheaves, and a second friction drive V-belt reeved about said second and driven sheaves, said single control lever being mounted near a base end in a manner to permit said forward and rearward movements and said second axis movement at a control handle end, and an overcentering bellcrank means to interconnect said lever and said carrier member converting said forward and rearward movements of said lever into displacements of said spindle axle following said arc so that as said variator is progressively caused to move, a drive is first established as said V-belts are tensioned and then advanced in speed ratio to a maximum as said variator reacts to changes in V-belt tension, said gear transmission comprised of a reversing drive train and a non-reversing drive train to establish said forward and reverse travel drives, and a selective shift means to make effective said reversing and nonreversing drive trains one only at a time, and shift linkage means to interconnect said lever and said selective shift means so that said second axis movement of said lever to prescribed positions within said gate means will cause said gear transmission to be shifted to said forward and reverse travel drives.

4,698,049

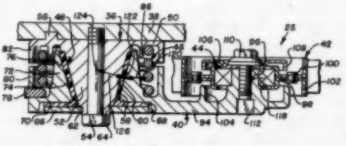
BELT TENSIONER WITH FRUSTOCONICAL PIVOT BEARING

Klaus K. Bytzek, Schomberg, and John R. Antchak, Rexdale, both of Canada, assignors to Litens Automotive Inc., Downsview, Canada

Filed Apr. 11, 1986, Ser. No. 850,700

Int. Cl.[4] F16H *7/12*

U.S. Cl. 474—135 **23 Claims**



1. In a belt tensioning device comprising a fixed structure, a pivoted structure, first bearing means mounting said pivoted structure on said fixed structure for pivotal movement about a first axis between first and second limiting positions, spring means acting between said fixed and pivoted structures for resiliently biasing said pivoted structure to move in a direction awat from said first limiting position toward said second limiting position with a spring load which decreases as said pivoted structure is moved in a direction away from said first position

toward said second position, a belt engaging pulley, and second bearing means mounting said pulley on said pivoted structure for rotational movement about a second axis parallel with said first axis in such a way that a belt tension applied to said pulley will be transmitted to said pivoted structure with a tangential force component acting in a direction to be resisted by an opposed spring load force component and a radially inward force component acting in a direction to be resisted by said fixed structure through said first bearing means, the improvement which comprises

said first bearing means comprising a frustoconical sleeve bearing having a frustoconical exterior surface and a frustoconical interior surface,

said pivoted structure including an annular portion having a frustoconical surface engaging one of said bearing frustoconical surfaces for applying the radially inward force component transmitted to said pivoted structure to said sleeve bearing,

the frustoconical surface of one of said annular portions being (1) formed on the exterior periphery thereof and (2) disposed in engagement with said interior bearing frustoconical surface,

the pivotal movements of said pivoted structure with respect to said fixed structure being defined about said first axis by relative pivotal sliding friction contact between at least one of said bearing frustoconical surfaces with the frustoconical surface of the associated annular portion engaged thereby,

said one annular portion having a load center point disposed on said first axis,

the other of said annular portions having a load center point disposed on a line disposed within a plane passing through said first and second axes corresponding to the one line of the two lines of intersection of said bearing frustoconical surface with said plane through which the radially inward force component transmitted by said pivoted structure is applied to said sleeve bearing,

said load center points being positioned such that the radially inward force component transmitted by said pivoted structure and resisted by said fixed structure is transmitted generally from one load center point to the other along a line extending between said points which is perpendicular to and bisects said one line so that the radially inward force component transmitted by said pivoted structure to said sleeve bearing is distributed evenly throughout the axial extent of said sleeve bearing.

4,698,050

LAMINATED METALLIC BELT FOR TORQUE TRANSMISSION DEVICE AND METHOD OF MANUFACTURE THEREOF

Torao Hattori, Saitama; Yasushi Takagi, Kanagawa; Akira Tange, Kanagawa; Chiharu Umetsu, Kanagawa; Osamu Kudo, Kanagawa; Kiyoshi Kurimoto, Kanagawa, and Rou Kitamura, Kanagawa, all of Japan, assignors to Honda Giken Kogyo, K.K. and NHK Spring Co., Ltd., both of Tokyo, Japan

Filed May 7, 1986, Ser. No. 860,592

Claims priority, application Japan, May 18, 1985, 60-106761

Int. Cl.[4] F16G *5/16*

U.S. Cl. 474—242 **16 Claims**

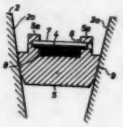
1. A laminated metallic belt consisting of a plurality of layers of endless metallic band and having an innermost surface defined by the innermost layer of endless metallic band, an outermost surface defined by the outermost layer of endless metallic band, and side edges formed by the side edges of the endless metallic bands, for use in a torque transmission device in combination with a plurality of metallic blocks contacting the innermost surface of the laminated metallic belt and arranged along the laminated metallic belt, wherein:

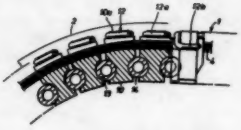
at least the side edges of each endless metallic band are hardened.

11. A method of manufacturing a laminated metallic belt for use in a torque transmission device in combination with a plurality of metallic blocks, comprising the steps of:

laminating a plurality of metallic band layers to form a belt having an innermost surface defined by the innermost metallic band layer, an outermost surface defined by the outermost metallic band layer, and lateral side edges defined by the side edges of the metallic band layers; and

forming a nitride layer over the lateral side edges of the metallic band layers.





15. A method of manufacturing a laminated metallic belt for use in a torque transmission device in combination with a plurality of metallic blocks, comprising the steps of:

laminating a plurality of metallic band layers to form a belt having an innermost surface formed by the innermost metallic band layer, an outermost surface defined by the outermost metallic band layer, and lateral side edges defined by the side edges of the metallic band layers; and

conducting an electroless nickel plating on the lateral side edges of the metallic band layers.

4,698,051

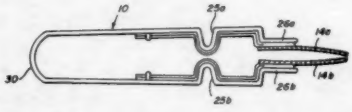
PLASTIC BAG OPENING DEVICE

Ralph S. Jacobson, 27970 Le Dunne Avenue, Aldergrove, British Columbia, VOX 1A0, Canada

Continuation-in-part of Ser. No. 660,911, Oct. 15, 1984, Pat. No. 4,601,690. This application Jul. 14, 1986, Ser. No. 885,150

Int. Cl.[4] B31C *3/00*

U.S. Cl. 493—309 **2 Claims**



1. A device for opening the ends of thin gauge plastic bags, comprising:

a resilient U-shaped member being biased to a normally open position which allows the slit edge of a plastic bag to be positioned between the open ends thereof;

an inwardly facing tip appended to each of said ends;

a pair of nubbins affixed, respectively, to the inside surfaces of said ends of said resilient U-shaped member inboard of said inwardly facing tips;

a multilayered adhesive strip stretched over the inside surfaces of each of said inwardly facing tips and onto said nubbins, at least a portion of the exposed surface of each layer having an adhesive substance thereon to make adhesive contact with respective ones of said ends of said thin gauge plastic bag to allow said bag to be opened as said U-shaped member moves to its normally open position; and

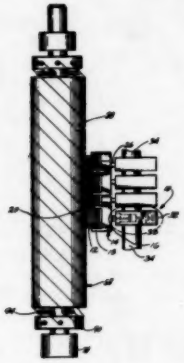
a pair of inwardly facing protrusions affixed to the inner surfaces of each of said ends of said device, said protrusions contacting each other when said inwardly facing tips and multilayered strips clamp onto said plastic bag.

4,698,052

APPARATUS FOR CONSTANT PRESSURE DIAGONAL-WEB CRUSH-SCORING

Yefim Slobodkin, Lyndhurst, Ohio, assignor to Avery International Corporation, Pasadena, Calif.

Filed Dec. 4, 1985, Ser. No. 804,817
Int. Cl.[4] B05B *1/14*
U.S. Cl. 493—355 **19 Claims**



1. Apparatus for use in combination with a crush-scoring cylinder for crush-scoring a web of paper, which apparatus comprises:

(a) a cylindrical anvil roller;

(b) a mounting bracket receiving at one end said cylindrical anvil roller in rotatable relation to said mounting bracket;

(c) a pair of guide rods attached to the opposed end of said mounting bracket, said guide rods being parallel to one another and extending, in substantially the same direction, into a support housing containing a corresponding pair of substantially frictionless bearings for receiving the pair of guide rods, to enable the guide rods to move into and from the support substantially without friction; and

(d) a substantially frictionless plunger means positioned between the guide rods and extending between the mounting bracket and means contained by the support for applying a predetermined unbiased force to the mounting bracket through the substantially frictionless plunger means for application to a web of paper undergoing crush-scoring by said cylindrical anvil roller; and

(e) means for securing said apparatus to a support associated with crush-scoring means for inducing a crush-score to said web of paper on application of a force from said anvil roller to a web of paper when passed between said anvil roller and said crush-scoring means.

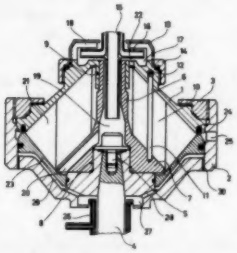
4,698,053

CENTRIFUGAL SEPARATOR

Klaus Stroucken, Ronninge, Sweden, assignor to Alfa-Laval Separation AB, Tumba, Sweden

Filed Jul. 1, 1986, Ser. No. 880,884
Claims priority, application Sweden, Jul. 5, 1985, 8503346-2
Int. Cl.[4] B04B *1/08*
U.S. Cl. 494—70 **10 Claims**

1. In a centrifugal separator including a rotor defining a separating chamber (21) and having two substantially circular parts, namely, an upper part (1) and a lower part (2) arranged coaxially and held together axially at their respective radially outer edge portions, a vertical drive shaft (4), said lower part (2) being mounted at the top of said shaft (4), a distributor mounted between said rotor parts coaxially therewith and having an annular conical base portion (7) for conducting liquid from the central portion of the rotor to a predetermined radial level in said chamber (21), the distributor also having a central neck portion (6) extending upward from said base portion (7), a set of separation discs (10) each having the form of a frustum of a cone with an inner edge and an outer edge, said set of discs (10) resting against said base portion (7) and being arranged coaxially around said neck portion (6) to leave an axially directed flow way for separated liquid between the inner disc edges and said neck portion (6), and means for securing said base portion (7) and neck portion (6) radially relative



to said lower part (2) and said upper part (1), respectively, said upper part (1) pressing the disc set axially against said base portion (7) and thus pressing the distributor against said lower part (2), the improvement comprising a plurality of guiding means (11) extending substantially axially at a radial distance from the distributor neck portion (6) in engagement with the separation discs (10), each guiding means (11) having opposite ends secured radially and in the periphery direction of the rotor relative to said rotor parts (1, 2), said means for securing said neck portion (6) radially relative to the upper rotor part (1) comprising a body radially secured relative to said upper part and having a circular cylindrical surface (9, 9a) through which said body abuts against a corresponding circular cylindrical surface of said neck portion (6).

4,698,054

METHOD FOR COLONIC AND INTESTINAL IRRIGATION

Ingrid B. Bloxom, Jr., P.O. Box 357, Wicomico, Va. 23184

Continuation of Ser. No. 707,717, Mar. 4, 1985, which is a division of Ser. No. 556,036, Nov. 29, 1983, Pat. No. 4,518,382.
This application May 2, 1986, Ser. No. 858,708
Int. Cl.[4] A61M *31/00*
U.S. Cl. 604—54 **7 Claims**

1. A method of establishing peristaltic action of the colonic and intestinal tract by irrigating the tract with a small volume of liquid to induce the peristaltic action of the intestines comprising the steps of:

(a) Introduce less than one pint of irrigant into the intestinal tract through a confined passage to initiate peristaltic action and further minimize the suppression of said peristaltic action of the intestines,

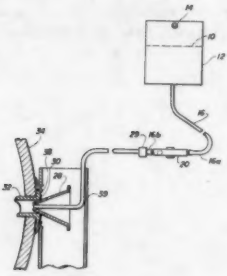
(b) positioning a moveable indicating member within said irrigating liquid within a conduit and within a restricted longitudinal path of travel along a length of the confined passage and allowing the indicating member to travel with the irrigating liquid along the length of the restricted path of travel between first and second opposite end thereof,

(c) monitoring the direction of liquid flow along the length of the confined passage by detecting a first direction of travel of the indicating member with the irrigating liquid

from the liquid supply to the intestine and towards the first opposite end of the restricted path of travel,

(d) monitoring the development of peristaltic action within the intestine by detecting the flow of irrigating liquid and the indicating element within the restricted path of travel in a second direction opposite to the first direction and towards the second opposite end of the restricted path of travel,

(e) controlling the flowing of irrigating liquid along the confined passage between the liquid supply and the intestine at a location therebetween,



(f) determining the establishment of sufficient peristaltic action to accomplish evaculation of the intestine by detecting the travel of the indicating element in the second direction until the indicating element reaches the second opposite end of the restricted path of travel,

(g) terminating liquid flow of irrigating liquid into the intestine from the liquid supply upon the indicating element reaching the second end of the restricted path of travel, and

(h) whereby the establishment of evacuation pressure due to peristaltic action within the intestine is accomplished through the introduction of a minimal amount of irrigating liquid to the intestine.

4,698,055

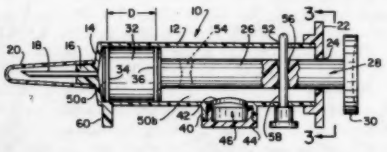
HYPODERMIC SYRINGE

Andrew I. Sealfon, 713 North Street, Middletown, N.Y. 10940

Filed Nov. 24, 1986, Ser. No. 934,158

Int. Cl.[4] A61M *37/00*

U.S. Cl. 604—82 **3 Claims**



1. A hypodermic syringe comprising a barrel having proximal and distal ends, a plunger extending outwardly of the proximal end and movably disposed within said barrel to divide said barrel into a pair of variable volume comprising and a fixed storage compartment located on the exterior of said barrel and having an opening in communication with the interior of said barrel at a selected point midway between the distal and proximal ends of said barrel, said plunger having a piston head on which is disposed a pair of seals spaced apart a distance at least equal to the opening from said fixed volume storage compartment, said plunger being positionable during its movement in said barrel to place said piston head straddling the opening from said fixed volume compartment to sealingly isolate said fixed volume compartment from said variable volume compartments, and a pin passing simultaneous through a hole in said barrel and said plunger proximaly of said piston head for releaseably locking said plunger against movement relative to said barrel at least in said straddling position.

4,698,056

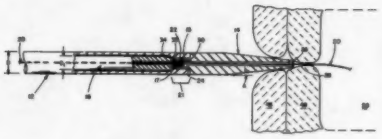
ENTERIC FEEDING DEVICE

Michael A. Ciannella, Marlboro, Mass., assignor to Medi-Tech, Inc., Watertown, Mass.

Filed Mar. 21, 1986, Ser. No. 842,557

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—164 **7 Claims**



1. A gastro-enterostomy device comprising

an elongated stiffening member,

an introducing catheter defining an elongated central lumen sized for receiving said stiffening member therewithin, with said catheter closely surrounding said stiffening member, and

a separable, generally conical introduction tip member in a releasable assembly with the distal end of said introducing catheter and said stiffening member therewithin for introduction into a human body via a puncture opening and said introduction tip member adapted to be released from said assembly with said introducing catheter and stiffening member within said human body,

whereby, for facilitating introduction of the device into the body, said device is provided by said introduction tip member with a conical tip of relatively small diameter at the distal end, and, upon release of said tip member from assembly with said introducing catheter and stiffening member within the body, the device is provided with an introduction lumen through said introducing catheter having an inner bore diameter relatively greater than the diameter of the distal end of said conical tip member.

4,698,057

BUILT IN ASSEMBLY FOR STABILIZING AND SECURING INTRAVASCULAR NEEDLE OR CATHETER LIKE DEVICE

Suresh K. Joishy, 413 W. Howe St., Bloomington, Ind. 47401

Filed Jun. 9, 1986, Ser. No. 875,883

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—176 **20 Claims**

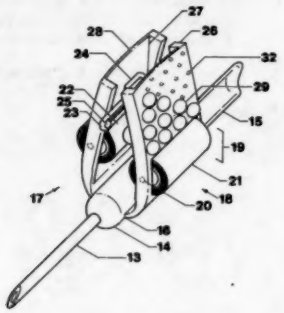
1. A device for stabilizing and securing an intravascular needle or catheter like surgical instrument to a patient, comprising:

a tubular intravascular surgical instrument having a hub and laterally extending wings attached to each side of the hub, said wings having a stabilizing means for stabilizing the position of said surgical instrument relative to a patient receiving said instrument, said stabilizing means including a plurality of suction cups on the undersurface of each wing,

an adhesive tape assembly having a cylindrical roller rotatably mounted to said one of the wings on the superior surface thereof and a roll of adhesive tape fixed at the inner end thereof to said cylindrical roller,

a grasping means fixed to the outer end of said adhesive

tape roll for facilitating the uncoiling of the tape roll, and



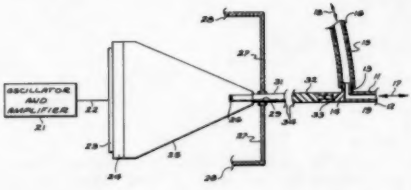
a securing means extending from the superior surface of said one of the wings for securing the grasping means thereto prior to uncoiling of said type roll.

4,698,058

ULTRASONIC SELF-CLEANING CATHETER SYSTEM FOR INDWELLING DRAINS AND MEDICATION SUPPLY

Albert R. Greenfeld, 31430 Glenbridge Rd., Westlake Village, Calif. 91361; Herbert Reis, and Bernhard R. Tittmann, both of Thousand Oaks, Calif., assignors to Albert R. Greenfeld, Westlake Village, Calif.

Filed Oct. 15, 1985, Ser. No. 787,728
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—266 **25 Claims**



1. A self-cleaning indwelling catheter system for enhanced nonsurgical protracted transfer of fluid between a patient's body and a point outside such patient's body, comprising:

an indwelling catheter particularly adapted for such nonsurgical protracted transfer of fluid between such patient's body and a point outside such patient's body;

at least one orifice that is defined near the proximal end of the catheter and that is subject to the presence of undesirable substance within the orifice or on the catheter at the orifice, or both, during such nonsurgical protracted transfer of fluid;

a source of mechanical disintegrating vibration; and

means for conveying the disintegrating vibration from the source to the orifice and concentrating the disintegrating vibration at the orifice to disintegrate the undesirable substance and so maintain such nonsurgical protracted transfer of fluid relatively free from obstruction and contamination by the undesirable substance;

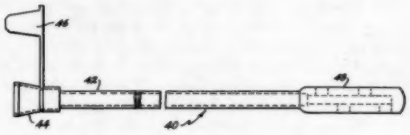
whereby the source and conveying means cooperate to prevent blockage of, or infection at, said catheter, or both, and to facilitate and enhance the nonsurgical protracted fluid-transfer purpose of the indwelling catheter.

4,698,059

ENTERAL FEEDING TUBES

Theodore D. Johnson, Largo, Fla., assignor to Concept Polymer Technologies, Inc., Clearwater, Fla.

Continuation of Ser. No. 559,685, Dec. 9, 1983, abandoned. This application Sep. 26, 1986, Ser. No. 912,217
Int. Cl.[4] A61M *31/005*
U.S. Cl. 604—270 **27 Claims**



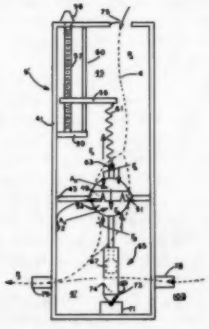
1. An enteral feeding tube comprising a tubular stem and a unitary, molded weighted bolus connected to one end of the stem, the bolus having a central bore communicating with the interior of the stem and extending over at least a portion of the length of the bolus, the central bore being in communication with the exterior of the bolus through at least one opening in the bolus and the bolus being insert molded at the time of its formation onto the preformed stem, the bolus and the stem having substantially the same polymeric composition comprising a thermoplastic elastomeric hydrocarbon block copolymer and an essentially linear polysiloxane having a kinematic viscosity of 20 to 10^6 centistokes at room temperature, the polysiloxane constituting from about 0.1 to 12% by weight of the polymeric composition and the weighted bolus is formed of a mixture of from about 10 to 20 weight percent of said polymer composition and 80 to 90 weight percent of tungsten powder.

4,698,060

PRESSURE REGULATION SYSTEM

Nicholas F. D'Antonio, and Nicholas J. D'Antonio, both of 7695 Admiral Dr., Liverpool, N.Y. 13088

Filed Aug. 20, 1984, Ser. No. 642,563
Int. Cl.[4] A61M *1/00*; F16K *21/10, 15/00*; G01L *13/02*
U.S. Cl. 604—320 **13 Claims**



5. Apparatus for regulating the pressure of a gas in a control space in communication with a first space of variable subatmospheric pressure and with a second space of subatmospheric pressure to control the flow of gas from the first space to the second space, said apparatus comprising:

a first compartment in communication with the atmosphere;

a second compartment at the pressure of the control space, said second compartment providing a continuous path for any flow of gas from the first space to the second space;

dividing means dividing said first compartment and said second compartment, and including an opening for ren-

dering said first compartment in communication with said second compartment;

closing means movable between an opening position for opening said opening and a closing position for closing said opening, a differential in the pressures between said first compartment and said control space in one sense biasing said closing means towards the opening position and a differential in the pressures between said first compartment and said control space in the opposite sense biasing said closing means towards the closing position;

biasing means for biasing said closing means towards the closing position with a force which establishes a force equilibrium across said closing means to open said opening by an amount to admit sufficient air at atmospheric pressure necessary to establish a pressure in said control space to effect a desired flow of gas from first space to the second space, said closing means continuously opening and closing said opening to effect the admission of said sufficient amount of air; and

damping means operatively connected to said closing means for damping the resultant force applied to said closing means in at least one direction.

4,698,061

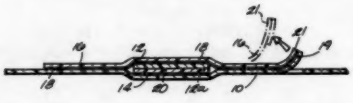
INJECTION SITE PACKAGE

Walter A. Makaryk, Mt. Prospect; Thomas E. Dudar, Palatine, and Mary K. Zentz, Mundelein, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 585,480, Mar. 2, 1984, abandoned. This application Apr. 18, 1986, Ser. No. 854,685

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—408 **7 Claims**



1. An injection site package which can be attached to a needle-pierceable wall, said package comprising;

a resealable rubber injection pad having opposite first and second pad faces,

a first overlay covering sad first pad face,

a second overlay covering said second face pad,

first adhesive means at least partly covering said first pad face for removably joining said first overlay and said first pad face and for permitting separation of said first overlay from said first pad face upon the application of a peeling force, said first adhesive means being further operative, upon separation of said first overlay, for joining said first pad face and the needle-pierceable wall,

second adhesive means at least partly covering said second face for removably joining said second overlay and said second pad face and for permitting separation of said first overlay and said second adhesive means from said second pad face upon the application of a peeling force,

said first overlay being separable from said first pad face without separating said second overlay from said second pad face as a peeling force is applied to said second overlay, thereby exposing said first pad face for joining the needle-pierceable wall, and

said second overlay and said second adhesive means being separable from said second pad face without separating said first pad face from the needle-pierceable wall as a peeling force is applied to said second overlay, thereby exposing said second pad face to the needle used to pierce the needle-pierceable wall.

4,698,062

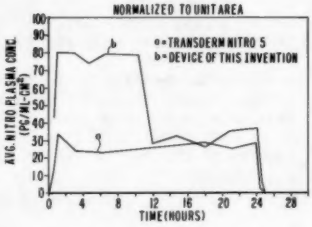
MEDICAL DEVICE FOR PULSATILE TRANSDERMAL DELIVERY OF BIOLOGICALLY ACTIVE AGENTS

Robert M. Gale, Los Altos, and Randall Berggren, Livermore, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Oct. 30, 1985, Ser. No. 792,941

Int. Cl.[4] A61K *9/00*

U.S. Cl. 604—896 **35 Claims**



1. A medical device for the pulsitile administration of a drug through intact skin at a first steady state flux during a first delivery period and a second steady state flux during a second delivery period, said first and second delivery periods comprising a substantial portion of a predetermined administration period; said device comprising:

(a) a reservoir of said drug containing an amount of drug at least sufficient to administer drug at said first and second steady state fluxes throughout said administration period, said first steady state flux being substantially higher than said second steady states flux

(b) a reservoir of a skin permeation enhancer for said drug; said reservoir containing an amount of permeation enhancer (i) sufficient to permit administration of said permeation enhancer at permeation enhancing fluxes through said first delivery period and (ii) insufficient to permit administration of said permeation enhancer at permeation enhancing fluxes during the remainder of said administration period; and

(c) means for maintaining said device on the skin in drug and permeation enhancer transferring relationship thereto; whereby a pulsitile drug administration pattern, having a first flux substantially higher than the flux of drug through untreated skin during said first period and a second, substantially lower flux during said second delivery period, will be obtained.

4,698,063

DEVICE FOR EMBEDDING IN BONE, IN PARTICULAR A FEMORAL HIP-JOINT PROSTHESIS

Helmut D. Link, Wildstieg 14, 2000 Hamburg 65, and Arnold Keller, An der Naherfurth 5, 2061 Kayhude, both of Fed. Rep. of Germany

Continuation of Ser. No. 472,853, Mar. 7, 1983, abandoned. This application Nov. 6, 1985, Ser. No. 795,368

Claims priority, application Fed. Rep. of Germany, May 3, 1982, 3216538

Int. Cl.[4] A61F *2/32*

U.S. Cl. 623—23 15 Claims

1. A hip-joint prosthesis comprising:

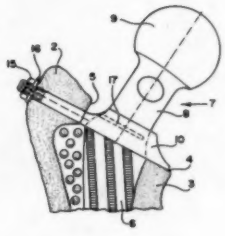
a head portion,

a stem portion adapted to be anchored in a femur bone,

a neck portion interconnecting said head and said stem portions, and

a removable support collar for mounting to said neck portion in a fixed position in engagement with the end of a femur bone, said collar being U-shaped and having a first open end and an opposing enclosed end and

having first and second sides defining a recess portion configured to receive said neck portion when said collar is mounted to said neck portion, said neck portion and said recess portion having cooperating means for selectively mounting said support collar in a fixed position on said stem and removing said support collar from said neck portion while said stem portion is anchored in a femur bone, said first end forming an opening of sufficient size for passage of said neck portion therethrough to permit selective removal of said collar from said neck portion while said stem portion is anchored in a femur bone, and



a bottom surface adapted to rest upon the end of the femur bone so as not to extend into the femur bone to facilitate removal of said collar from said neck portion while said stem portion is anchored in a femur bone.

4,698,064

USE OF SULFONATED 2-(2'-HYDROXYARYL)-S-TRIAZINES AS PHOTOSTABILIZING AGENTS FOR WOOL AND OTHER PROTEIN FIBRES

Neil A. Evans, East Ivanhoe; Brian Milligan, North Balwyn, and Peter J. Waters, Gladstone Park, all of Australia, assignors to Commonwealth Scientific and Industrial Research Org., Campbell, Australia

PCT No. PCT/AU85/00297, § 371 Date Aug. 7, 1986, § 102(e) Date Aug. 7, 1986, PCT Pub. No. WO86/03528, PCT Pub. Date Jun. 19, 1986

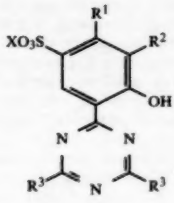
PCT Filed Nov. 29, 1985, Ser. No. 905,384

Claims priority, application Australia, Dec. 7, 1984, PG8461

Int. Cl.[4] D06M *3/02, 13/00*

U.S. Cl. 8—128 R **9 Claims**

1. A method for protecting proteinaceous fibres and blends thereof against photodegradation and thermal degradation which comprises treating the fibres under acidic conditions with a sulfonated s-triazine derivative of formula I or II;



I

wherein

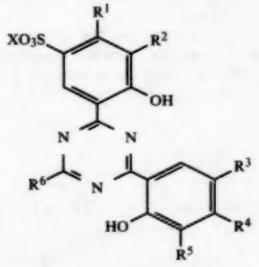
R^1 is hydrogen, alkyl, hydroxyl, O-alkyl, OOC-alkyl or OOCNH-alkyl;

R^2 is hydrogen, alkyl or $—SO_3X$;

R^3 is aryl, substituted aryl or O-alkyl; and

X is hydrogen, NH_4 or alkali metal;

OR



II

wherein

R^1 and R^4 are hydrogen, alkyl, hydroxyl, O-alkyl, OOC-alkyl or OOCNH-alkyl;

R^2 and R^5 are hydrogen, alkyl or $—SO_3X$;

R^3 is hydrogen or $—SO_3X$;

R^6 is aryl, substituted aryl, O-alkyl or O-aryl; and

X is hydrogen, NH_4 or alkali metal.

4,698,065

LIQUID OXIDATION HAIR DYE WITH PHASE STABILIZER

Horst Hoeffkes, Duesseldorf-Hellerhof, and Dieter Schrader, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 8, 1986, Ser. No. 816,919

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1985, 3500877

Int. Cl.[4] A61K *7/13*

U.S. Cl. 8—406 **28 Claims**

1. A homogeneously stabilized liquid oxidation hair dye preparation comprising:

(A) a hair dye-effective amount of a hair dye precursor;

(B) an aqueous or aqueous-alcoholic carrier;

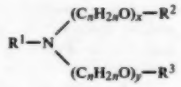
(C) about 5 to 20% by weight of a fatty acid water-soluble soap;

(D) a conditioning-effective amount of at least one water-soluble cationic polymer; and

(E) a stabilizer-effective amount of at least one water-soluble compound, which is:

(i) an aliphatic or alicyclic C_{9-44}-dicarboxylic acid salt, or

(ii) an amine of the formula



wherein R^1 is a C_{8-22} alkyl,

R^2 and R^3 are, independently, H or R^4—COO—, where R^4 is a C_{1-21}-alkyl or -alkenyl,

n is 2 or 3, and

x and y are, independently, 0 or an integer from 1 to 5, the sum of x+y being in the range 2 to 6.

4,698,066

AMINE OXIDATION DYE HAIR TREATING COMPOSITIONS

David Rose, Hilden; Norbert Maak, Neuss, and Edgar Lieske, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Mar. 20, 1986, Ser. No. 841,901

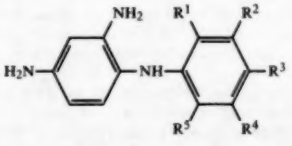
Claims priority, application Fed. Rep. of Germany, Mar. 20, 1985, 3510039

Int. Cl.[4] A61K *7/13;* **C07C** *143/56, 101/48*

U.S. Cl. 8—408 **34 Claims**

1. In an oxidative dye hair treating composition containing at least one first oxidation dye precursor, optionally at least one substantive hair dye, and a cosmetic carrier, the improvement wherein

said at least one first oxidation dye precursor is a coupler which is present in an amount sufficient to form an effective hair dye upon oxidation coupling, and consists essentially of a compound of the following formula, or a water soluble salt thereof:



wherein:

(a) one of R^1 to R^5 is $—SO_3H$, —COOH, or $—CH_2—COOH$;

(b) from 2 to 4 R^1 to R^5 are H; and

(c) the remaining of R^1 to R^5 are independently C_{1-4}-alkyl, C_{1-4}-alkoxy, or Cl; and

a second oxidation dye precursor comprising at least one developer which is a compound other than said first oxidation dye precursor is present in a first:second oxidation dye precursor mol ratio of 1:0.5–2.0.

4,698,067

FORMCOKE HAVING MODIFIED BITUMINOUS BINDER

Joseph H. Finley, Metuchen, N.J.; Richard R. Severns, and Robert M. Zakotnik, both of Kemmerer, Wyo., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 747,636, Jun. 24, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 932,755

Int. Cl.[4] C10L *5/12, 5/14*

U.S. Cl. 44—15 B **12 Claims**

1. A process for producing formcoke comprising the steps of: (1) introducing separately into a mixing zone on a weight basis from about 75% to about 90% of a particulate carbon and as an overall binder therefor from about 10% to about 25% of a mixture containing from about 4% to about 23% of a formcoke bituminous binder and as a supplementary binder from about 14% to about 1.0% of a combined quantity and in a weight ratio of about 9 to 1 of an aqueous carbohydrate having a concentration by weight of about 50% to about 80% and phosphoric acid having a concentration by weight of about 50% to about 100%, the water content of the resulting mixture not exceeding about 15% by weight (2) compressing the mixture from the mixing zone into compacted green shapes and (3) curing the compacted green shapes in an oxygen-containing atmosphere.

3. The process of claim 1 wherein the particulate carbon is calcined coal char.

4,698,068

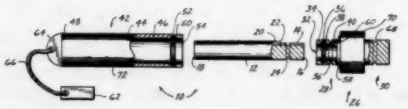
FIRE STARTER

Eric Jensen, 735 Bayshore Dr., Tarpon Springs, Fla. 33589

Filed Sep. 20, 1985, Ser. No. 778,409

Int. Cl.[4] C10L *11/00*

U.S. Cl. 44—39 **7 Claims**



1. A fire igniting device, comprising in combination:

a rod composed of an ignitable material;

a pyrophoric element;

means for securing said pyrophoric element to said rod;

a head including a rod receiving end and a case receiving end;

means for removably securing said rod to said rod receiving end of said head, whereby said rod may be removed from said head and discarded allowing a new rod to be installed thereto;

a case for receiving said rod during nonuse and means for removably securing said head to said case;

means for fitting said case to said case receiving end of said head to increase the effective length of said head, thereby providing handle means; and

a striker tethered to said casing for shaving particles from said rod and for striking said pyrophoric element to create sparking.

4,698,069

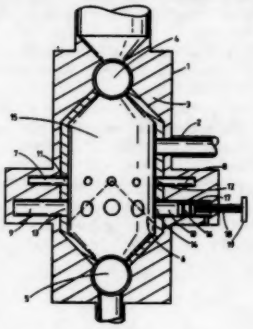
CYCLIC GAS WITH SOLID REACTION PLANT

Joseph C. Firey, P.O. Box 15514, Seattle, Wash. 98115-0514

Filed Apr. 28, 1986, Ser. No. 856,808

Int. Cl.[4] C10J *3/00, 3/22*

U.S. Cl. 48—61 **6 Claims**



1. In a cyclic gas with solid reaction plant for reacting gases with solid reactants and comprising: at least two reaction chambers; said at least two reaction chambers being connected to one another; at least one of said at least two reaction chambers containing at least one solid reactant; at least one other of said at least two reaction chambers being free of said at least one solid reactant; means for cyclically compressing all of said at least two reaction chambers concurrently with at least one reactant gas, followed by concurrently expanding primary product reacted gases, formed by reaction of said at least one solid reactant with said at least one reactant gas and unreacted gas reactant; wherein the improvement comprises including in said cyclic gas with solid reaction plant a reactant gas reservoir system comprising:

at least one reactant gas reservoir;

means for connecting each of said at least one reactant gas reservoir to at least one of said at least two reaction chambers so that at all times each said at least one reactant gas reservoir has an open gas flow connection to at least one of said at least two reaction chambers.

4,698,070

CUTTING INSERT FOR INTERRUPTED HEAVY MACHINING

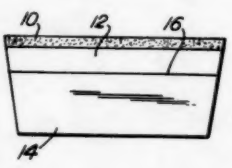
John M. Ohno, Plymouth, Mich., assignor to General Electric Company, Detroit, Mich.

Filed Dec. 16, 1981, Ser. No. 331,380

The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.

Int. Cl.[4] C04B *35/56*

U.S. Cl. 51—307 **15 Claims**



1. A cutting insert comprising:

a polygonal composite having a plurality of corners, said composite including (i) a top layer covering said composite including a first concentration of super-hard crystals selected from the group consisting of diamond or cubic

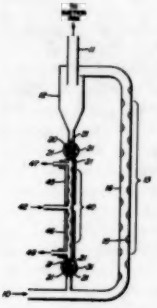
boron nitride crystals, (ii) a core layer and (iii) corner portions containing a second concentration of said superhard crystals disposed exclusively at said corners of said composite between said top layer and said core layer, wherein said top layer, core layer and corner portions are united by a matrix of silicon carbide and silicon and form a composite having a thickness of ¼ inch or 3/16 inch.

4,698,071

TRACE VAPOR CONCENTRATOR

Lorne Elias, Nepean, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Apr. 11, 1986, Ser. No. 850,524
Claims priority, application Canada, Apr. 15, 1985, 479118
Int. Cl.[4] B01D *53/08*
U.S. Cl. 55—28 31 Claims



1. A method for the rapid and continuous concentration of trace vapours in a gaseous medium comprising the steps of entraining an adsorption powder for the trace vapours in a stream of the gaseous medium in an adsorption region, passing the gaseous stream containing the powder and adsorbed vapour through a particle separator to produce a substantially powder-free sample gas and to collect the powder containing adsorbed vapours, passing the powder through a desorption region in contact with a carrier gas stream, heating the powder sufficiently in the desorption region to release the adsorbed trace vapours into the carrier stream, and then recovering the carrier gas with the desorbed vapours from the powder.

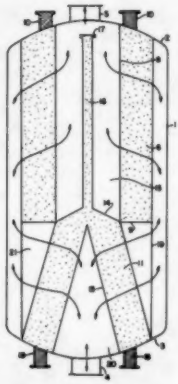
19. A continuous trace vapour preconcentrator comprised of a gaseous medium sample inlet, a vapour adsorption region, a particle separator, a vapour desorption region, and vapour takeoff outlet; wherein said inlet allows for the introduction of a stream of sample gaseous medium and a quantity of suitable adsorbent powder; said adsorption region provides mixing of the sample flow resulting in contact of the powder with the sample stream; said particle separator is adapted to separate the powder with adsorbed vapours from the gaseous sample stream; said desorption region has a heating zone, means for heating the heating zone, and means for the introuduction of a low flow carrier stream; and said vapour takeoff outlet allows for the removal of the carrier stream with enriched vapour concentrate, said carrier stream having a low flow rate relative to the flow rate of the gaseous sample stream.

4,698,072

ADSORBER BED APPARATUS

Wilhelm Rohde, Munich; Hannsjorg Koch, Wolfratshausen, and Michael Metschl, Penzberg, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed May 22, 1986, Ser. No. 865,718
Claims priority, application Fed. Rep. of Germany, May 22, 1985, 3518367
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—31 25 Claims



1. In an adsorber unit having two adsorber beds arranged in a common housing, in which a first adsorber bed is enclosed by elongated gas-permeable walls that are disposed substantially vertically and in mutual opposition thereto, so that a substantially horizontal gas flow can occur in the first adsorber bed, and wherein a second adsorber bed is arranged below and in flow communication with the first adsorber bed, wherein the improvement comprises said first adsorber bed being fabricated in the form of an annular cylinder, the interior of which is in communication with a conduit means for feeding and/or discharging gas, said annular cylinder being arranged coaxially to said second adsorber bed; said second adsorber bed being arranged so that it has an upper apex lying in a vertical central axis and descending flanks which slope in the downward direction with increasing distance from the central axis, said second adsorber bed being rotationally symmetrical about said vertical central axis, said descending flanks being at least partially enclosed by gas-permeable walls, said second adsorber bed having a substantially constant adsorber layer thickness in the region of the descending flanks; and a charging pipe being positioned within said common housing leading from the apex of said second adsorber bed through the interior of said first adsorber bed into an upper zone of said common housing.

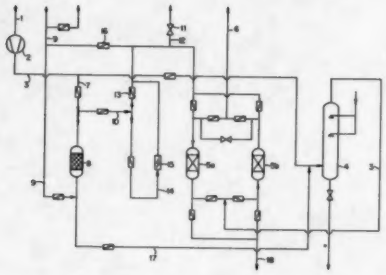
19. In an adsorber unit having two beds arranged in a common housing, in which a first adsorber bed is enclosed by elongated gas-permeable walls that are disposed substantially vertically and in mutual opposition thereto, so that a substantial horizontal gas flow can occur in the first adsorber bed, and wherein a second adsorber bed is arranged below and in fluid communication with the first adsorber bed, wherein the improvement comprises said second adsorber bed being arranged so that it has an upper apex lying in a vertical central axis and descending flanks which slope in the downward direction with increasing distance from the central axis, said descending flanks being at least partially enclosed by gas-permeable walls, and a central pipe being positioned within said common housing leading from the apex of said second adsorber bed through the interior of said first adsorber bed into an upper zone of said common housing.

4,698,073

PROCESS FOR REGENERATION OF ADSORBERS

Wilhelm Rohde, Munich, and Günter Klein, deceased, late of Neuried, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 657,709, Oct. 4, 1984, abandoned. This application Feb. 26, 1986, Ser. No. 832,791
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1983, 3336427
Int. Cl.[4] B01D *53/04, 53/26*
U.S. Cl. 55—33 21 Claims



1. In a process for the regeneration of an adsorber loaded with impurities removed from air by passing a stream of hot low-pressure regeneration gas through the adsorber, the improvement being wherein one- or multi-step compression of the air is effected such that the temperature of the air after each compression step is in the range of 80° to 130° C.; wherein a minor portion of compressed air is conducted through a heat reservoir for a period of time at least sufficient to raise the temperature of the heat reservoir air outlet end to substantially the temperature of the compressed air and then terminating the flow of compressed air through the heat reservoir; and wherein the low-pressure regeneration gas, during a hot gas regeneration phase of the adsorber, is conducted through the heat reservoir and thereby heated to a temperature not more than 4° C. below the temperature of the compressed air, and thereafter passed through the adsorber.

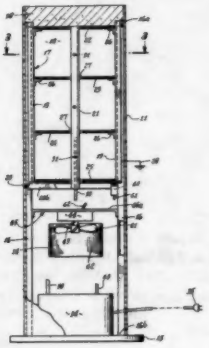
21. In a process for the separation of air by low-temperature fractionation with a purification of air by adsorption in at least two cyclically switchable adsorbers and a two-stage low-temperature air fractionation including a high-pressure rectification column and a low-pressure rectification column; with a recovery of a nitrogen fraction from the top of the low-pressure rectification column and using part of said low-pressure nitrogen fraction for the regeneration of an adsorber loaded with impurities previously removed from air by conducting hot nitrogen through the adsorber, the improvement being wherein one or multi-step compression of the air is effected such that the temperature of the air after each compression step is in the range of 80° to 130° C.; wherein a minor portion of compressed air is conducted through a heat reservoir for a period of time at least sufficient to raise the temperature of the heat reservoir air outlet end to substantially the temperature of the compressed air and then terminating the flow of compressed air through the heat reservoir; and wherein the low-pressure nitrogen is heated, by passage through the heat reservoir, to a temperature not more than 4° C. below the temperature of the compressed air, and thereafter is passed through the adsorber.

4,698,074

AIR CLEANING APPARATUS

Newell E. Cumming, and James H. Sidell, both of Encino, Calif., assignors to Cumming Corporation, Chatsworth, Calif.

Filed Feb. 9, 1987, Ser. No. 12,605
Int. Cl.[4] B03C *3/01, 3/09, 3/12*
U.S. Cl. 55—126 12 Claims



1. In an electrostatic air cleaning device, the combination comprising

(a) housing means including an upright tubular shell, having an upper air inlet and a lower air outlet,

(b) a fan in said housing means for effecting air flow into said inlet, downwardly in the shell, and out said outlet,

(c) an upright post in the shell,

(d) a frame received downwardly in the shell, and vertically spaced, electrically conductive grids carried by the frame; the grids defining openings to pass the post as the frame is received downwardly into the shell,

(e) electrical cable means associated with the post, and tips connected to said cable exposed to air spaces defined between the grids, and

(f) means to supply high voltage of one polarity to the cable and tips, the grids being at a different voltage level such that ions discharged from said tips cause collection at the grids of particulate in air flowing downwardly in the shell.

4,698,075

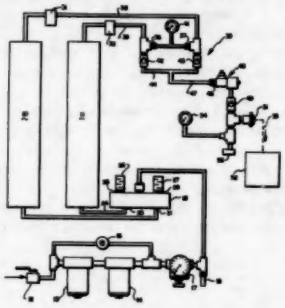
CONTROL SYSTEM FOR FLUID ABSORPTION SYSTEMS AND THE LIKE

Fernand J. Dechene, New Britain, Conn., assignor to International Oxygen Company, Inc., New Britain, Conn.

Filed Jun. 5, 1986, Ser. No. 871,458
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—163 17 Claims

1. A fluid absorption system comprising regenerative beds operable to cyclically produce effluent in pressure surges, and a flow divider operable to recirculate a substantially constant first percentage of said effluent for regenerating said beds and to deliver a substantially constant second percentage as product against a variable back pressure, said flow divider including first and second branches having flow restrictors therein said first branch operating to deliver said first percentage of effluent for regeneration of said beds said second branch including an automatically compensating pressure regulating valve operable to maintain a pressure differential across the

flow restrictors in said second branch which is substantially independent of said back pressure so that said second percentage of product delivered remains substantially constant as said back pressure varies.

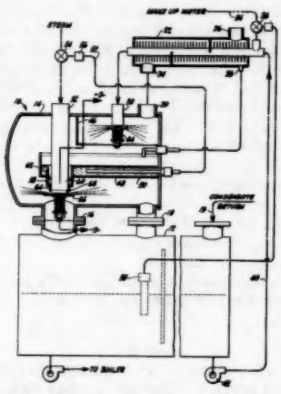


4,698,076

ATMOSPHERIC DEAERATOR UNIT

Martin Bekedam, 103 Brookline, Moraga, Calif. 94556

Filed Apr. 14, 1986, Ser. No. 851,965
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—164 **13 Claims**



1. In a deaerator system for deaerating boiler feedwater having a deaerator tank with a boiler feedwater line, a condensate return, a makeup water line and a steam source line, the improvement comprising a deaerator unit operable in conjunction with the deaerator tank, the deaerator unit having:

(a). a container with a vent;

(b). a structure arranged with said air vent to form a vent confines;

(c). a water spray nozzle connected to the makeup water line, the spray nozzle constructed to spray water in a fine spray in the confines of the air vent;

(d). a water spray collection reservoir arranged with the water spray nozzle to collect water sprayed from the nozzle;

(e). a steam operated water atomizer connected to the steam source line arranged to receive water from the water reservoir for atomization by direct contact by steam from the steam source;

(f). a water temperature sensor arranged for water submersion in the water reservoir;

(g). steam supply control means for regulating the volume of steam supplied to said water atomizer according to that required to maintain a relatively constant reservoir water temperature, proximally under the vaporization temperature; wherein steam and noncondensible gases released on spraying and atomizing the water pass to the confines to said vent, steam being condensed and noncondensible gases being passed through said vent.

4,698,077

SEPARATING APPARATUS

Heikki Peltola, Soramäki, Finland, assignor to Flakt Aktiebolag, Stockholm, Sweden

Filed Jan. 13, 1986, Ser. No. 818,336
Claims priority, application Finland, Jan. 16, 1985, 850301
Int. Cl.[4] E01D *45/12*
U.S. Cl. 55—204 **12 Claims**

1. An apparatus for the production of stock for paper using edge trimmings from paper, the apparatus comprising in combination

a pulper having an upper and lower portion, the pulper being adapted to contain stock; an agitator in the lower portion of the pulper for the agitation of stock;

a first cyclone in the upper portion of the pulper to provide edge trimmings for the stock; and

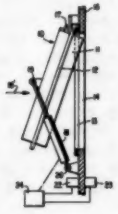
a second cyclone disposed within the first cyclone, the second cyclone having an air flow direction opposite that of the first cyclone, the first and second cyclones providing edge trimmings for the stock with a minimization of dust formation.

4,698,078

SEPARATOR ASSEMBLY

Stratos Mavros, Franklin Lakes, N.J., assignor to Parmatic Filter Corporation, Wayne, N.J.

Continuation of Ser. No. 783,037, Oct. 2, 1985, abandoned. This application Sep. 4, 1986, Ser. No. 906,552
Int. Cl.[4] B01D *46/46, 50/00*
U.S. Cl. 55—213 **55 Claims**



1. A separator assembly for an air duct for normally removing particulate matter entrained in air passing through said air duct, the air being introduced to flow through said air duct in a first direction, said separator assembly comprising:

separating means for removing particulate matter entrained in the air passing therethrough;

mounting means for mounting said separating means relative to said air duct so as to be moveable between a first position in which said separating means is arranged so that air passing through said air duct passes through said separating means and a second position in which said separating means is arranged so that air passing through said air duct bypasses said separating means; and

holding and power-applying means for holding said separating means in said first position and for applying power to said separating means to force said separating means to undergo movement from said first position to said second

position, said movement being in a direction which is different from said first direction.

4,698,079

HIGH-PURITY NITROGEN GAS PRODUCTION EQUIPMENT

Akira Yoshino, Osaka, Japan, assignor to Daidousanso Co., Ltd., Osaka, Japan

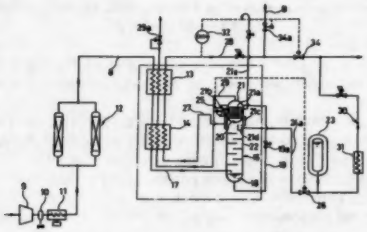
PCT No. PCT/JP85/00386, § 371 Date Mar. 12, 1986, § 102(e) Date Mar. 12, 1986, PCT Pub. No. WO86/00694, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 8, 1985, Ser. No. 845,277

Claims priority, application Japan, Jul. 13, 1984, 59-146332

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—11 **3 Claims**



1. An apparatus for producing highly pure nitrogen gas comprising a means to compress the air taken from the outside, a means to remove carbon dioxide gas and water from the compressed air from said air compression means, a heat exchange means to chill the compressed air from said removing means to a cryogenic temperature, a rectification column to liquify a portion of the cryogenic compressed air from said heat exchange means and collect it in the lower region of the column while taking out pure nitrogen gas from the tip portion, wherein the apparatus further comprises a partial condenser segment having a condenser therin at the upper end of the rectification column, a feeding conduit to lead an accumlating liquified air in the lower region of the rectification column into the partial condenser segment for use as a refrigerant to cool said condenser, a blowoff conduit to blow off gasified liquid air produced in the partial condenser segment to the outside, a first relux liquid conduit to lead part of the nitrogen gas produced in the rectification column into said condenser, a second reflux liquid conduit to return the liquified nitrogen produced in the condenser to the rectification column as a reflux, a liquid nitrogen storage means to store liquid nitrogen supplied from outside the apparatus, a leading channel to lead the lquid nitrogen in the liquid nitrogen storage means to the column, a means to control the level of the liquid air in the condenser by controlling the supply of liquid nitrogen from the nitrogen storage means to the column, and an outlet channel to take out both the nitrogen gas from the rectification column and the gasified nitrogen in the recitification column after use as a cooling source, and to pass them through said heat exchanger and heat them by exchanging heat with the compressed air.

4,698,080

FEED CONTROL FOR CRYOGENIC GAS PLANT

Michael L. Gray, and Kristie C. Gibson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 621,336, Jun. 15, 1984, abandoned. This application May 21, 1986, Ser. No. 866,022

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—21 **13 Claims**

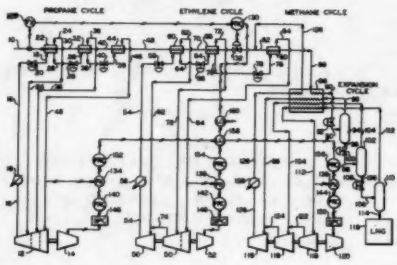
1. In a method for the cryogenic cooling of a normally gaseous feed which includes at least two compression cycles, each having at least a low pressure stage of compression and a turbine driver, and said compression cycles are adapted to compress a normally gaseous fluid selected from the group consisting of a refrigerant for cooling said normally gaseous feed and a portion of the normally gaseous feed, the improvement, comprising:

preventing overloading of said turbine drivers, due to changes in compressor limiting operating conditions, by:

(a) measuring the suction pressures to said low pressure stages of each of said compression cycles;

(b) establishing set point signals for each of said low pressure stages of each of said compression cycles, wherein said set point signals are representative of the maximum desired suction pressure;

(c) comparing the measured suction pressures and the set point suction pressures for the low pressure stages of each



of said compression cycles and establishing control signals in response to such comparison, wherein each of said control signals is responsive to the difference between the particular suction pressure and the particular set point compared and wherein each of said control signals is representative of the flow rate of said normally gaseous feed required to prevent the actual suction pressure for any particular low pressure stage of each of said compression cycles from exceeding the set point suction pressure for that particular low pressure stage of each of said compression cycles;

(d) selecting the one of the thus generated control signals which is representative of the lowest flow rate of said normally gaseous feed; and

(e) adjusting the flow rate of said normally gaseous feed in response to the selected control signal.

4,698,081

PROCESS FOR SEPARATING HYDROCARBON GAS CONSTITUENTS UTILIZING A FRACTIONATOR

Hafez K. Aghili, Katy, Tex., assignor to McDermott International, Inc., New Orleans, La.

Filed Apr. 1, 1986, Ser. No. 847,065

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—24 **12 Claims**

1. A process for separating the constituents of a gas stream comprising:

(a) lowering the temperature of said gas stream;

(b) supplying said lower temperature gas stream to a high pressure separator, said high pressure separator separating said gas stream into predominantly vapor and predominantly fluid streams;

(c) lowering the pressure of said predominantly vapor stream;

(d) supplying said lower pressure vapor stream to an upper region of a demethanizer column;

(e) lowering the pressure of said predominantly fluid stream;

(f) supplying said lower pressure fluid stream to said demethanizer column at an elevation below said vapor stream;

(g) removing cold vapor residue gas from an upper region of

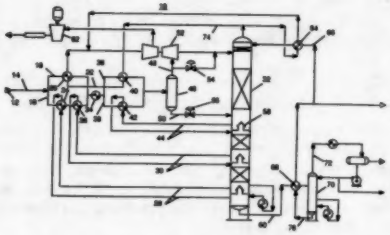
said demethanizer column, said vapor residue gas comprising predominantly of methane and other residual light vapors;

(h) passing said vapor residue gas through at least one heat exchanger to raise the temperature of said vapor residue gas;

(i) compressing said vapor residue gas for delivery elsewhere;

(j) removing a cold demethanized product from a lower region of said demethanizer column;

(k) supplying at least a portion of said demethanized product to a fractionator wherein said fractionator operates as a distillation column;



(l) separating said demethanized product into an ethane overhead product and a deethanized bottom product;

(m) removing a generally liquid deethanized product from a lower region of said fractionator;

(n) drawing off a portion of said deethanized product;

(o) lowering the temperature of said drawn off product; and,

(p) supplying said lower temperature deethanized product to the top of said demethanizer column whereby the addition of said product alters the chemical equilibrium existing in the top of said demethanizer column thereby enhancing the recovery of ethane constituents at the expense of a small reduction in recovery of propane and heavier constituents.

4,698,082

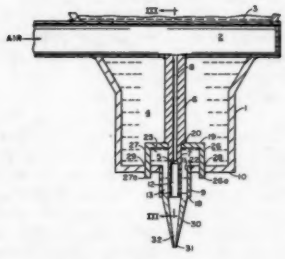
HOLLOW FIBER BUSHING AND HOLLOW FIBER TIP CONSTRUCTION

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 812,580, Dec. 23, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,428

Int. Cl.⁴ C03B *37/022*

U.S. Cl. 65—1 **8 Claims**



1. A bushing for producing hollow fibers comprising a container for molten glass, orifices in said container for removing glass as a plurality of hollow streams from said container, a gas tube positioned in each said orifice forming an annulus with each said orifice for transporting the molten glass outside of said container, anchoring means around the tube centering the tube in said orifices, means for attaching the anchoring means of each orifice to the container adjacent the associated orifice to thereby anchor the tube to the container so that the tube will maintain a constant spacial relationship to the orifice during use.

4,698,083

METHOD FOR PRODUCING GLASS FIBERS HAVING NON-CIRCULAR CROSS SECTIONS

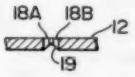
Kozo Shioura; Syuichi Yamazaki, and Hiroaki Shono, all of Fukushima, Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

Filed Mar. 21, 1986, Ser. No. 842,491

Claims priority, application Japan, Mar. 23, 1985, 60-57535; Mar. 23, 1985, 60-57536; Feb. 14, 1986, 61-28938

Int. Cl.⁴ C03B *37/022*

U.S. Cl. 65—2 **20 Claims**



1. A method of producing a glass fiber strand comprising: maintaining glass in a melt zone having a nozzle plate defining the bottom of said zone, said nozzle plate having a multiplicity of recesses in the lower surface thereof each having a set of spaced nozzle ports, said set of nozzle ports being in close proximity with one another and arrranged symmetrically with respect to the center of said recess; flowing the molten glass from said melt zone through flow paths defined by said nozzle ports, each of said recesses being configured so that the flow path of the nozzle port remote from the center thereof is longer than the flow path of the nozzle port near the center thereof; withdrawing glass filaments from said nozzle ports and fusing together the contiguous surfaces of the glass filaments exiting from each set of nozzle ports at a point towards the center of and below the recess in the nozzle plate to form single glass fibers; cooling the non-contiguous portions of the glass filaments so as to prevent the single glass fibers from assuming circular cross-sections; and gathering said glass fibers into a strand.

4,698,084

METHOD OF MANUFACTURING A PASSIVE FIBER OPTIC COMPONENT

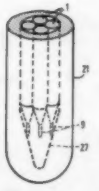
Adrianus P. Severijns; Petrus J. W. Severin, and Cornelus H. M. Van Bommel, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 17, 1986, Ser. No. 853,309

Claims priority, application Netherlands, Apr. 19, 1985, 8501147

Int. Cl.⁴ C03B *37/027*

U.S. Cl. 65—3.11 **5 Claims**



1. A method of manufacturing a passive fibre-optic component which comprises at least two optical fibres each having a core of core glass, a cladding of cladding glass with a refractive index lower than that of the core glass, and an outer coating, in which method a part of each fibre is bared by removal

of the outer coating over a given length from one end of the fibre, and the bare parts of the fibres are subjected to an etching treatment whereby a portion of the etched part of each fibre is given a conical shape, after which the etched portions of the fibres are arranged against each other in a tube of a glass having a refractive index lower than that of the core glass of the fibres, and by the application of heat the tube is fused to the fibres and the fibres are fused together in their bare parts, the fused fibre bundle being provided with a polished end face, characterized in that

by the etching treatment the bare part of each fibre is also given a cylindrical end portion which adjoins the conical portion at the narrow end thereof,

the tube is a capillary tube which is sealed at one end, and the tube and at least the cylindrical end portions of the fibres inserted therein are softened by heat while the tube is evacuated so that the wall thereof collapses against the fibres and, while maintaining a circular cross-section under the influence of surface tension, deforms said end portions of the fibres to eliminate the interstices between them and give these portions of the fibres collectively a circular cross-section so that they form with the tube a solid rod of circular cross-section, the tube being fused by the heat to said end portions of the fibres,

and the sealed end of the rod is removed to form on the rod an end face in which the ends of said end portions of the fibers are exposed, the etching of said end portions of the fibres being such that the diameter of said circular cross-section of said end portions after said deformation is substantially equal to the diameter of the core of a single fibre,

and said end face being ultimately subjected to a polishing and finishing treatment to finally obtain a fused fibre head.

4,698,085

APPARATUS FOR PRODUCING MINERAL FIBRES FROM SILICATE RAW MATERIALS SUCH AS BASALT, IN PARTICULAR BY BLAST DRAWING

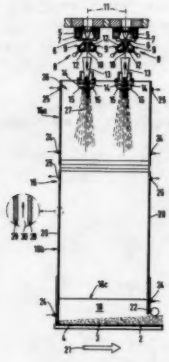
Dieter Bengl, Mutterstadt, and Johannes Horres, Ladenburg, both of Fed. Rep. of Germany, assignors to Grunzweig & Hartmann und Glasfaser AG, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,226

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509425

Int. Cl.[4] C03B *37/06*

U.S. Cl. 65—16 **4 Claims**



1. Apparatus for producing mineral fibres from silicate raw materials by blast drawing comprising:

(a) a melt tank;

(b) at least one distributor tank for receiving melt from said melt tank and having at least one exit orifice therein for expressing primary filaments of melt therefrom;

(c) a blast nozzle unit for fiberising said primary filaments arranged beneath said exit orifice at a distance therefrom and symmetrical to the line of flight of said primary filaments;

(d) a vertical chute arranged beneath said blast nozzle unit for receiving a flow bundle of fibres therefrom, said chute having an upper entry zone and vertically extending circumferential walls comprising a pair of spaced-apart front walls and a pair of spaced-apart side walls, each of said walls being constructed of a rigid material, having a hollow space extending along the vertical length thereof and connections for circulating a cooling liquid therein;

(e) spray means arranged in said entry zone of said chute for spraying fluid binder into said flow bundle; and

(f) a conveyor belt arranged beneath the lower end of said chute and on which fibres emerging from said chute are laid and transported away in the form of a continuous web.

4,698,086

APPARATUS FOR PRODUCING MINERAL FIBRES FROM MOLTEN SILICATE BY BLAST DRAWING

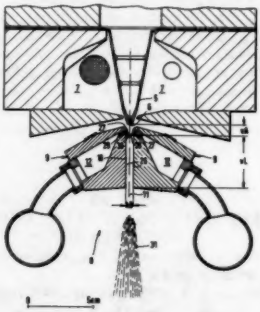
Gaston Fachat, Ladenburg; Klaus Sistermann, Neustadt, and Heinz-Jürgen Ungerer, Viernheim, all of Fed. Rep. of Germany, assignors to Grunzweig & Hartmann und Glasfaser AG, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,225

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509426

Int. Cl.[4] C03B *37/06*

U.S. Cl. 65—16 **2 Claims**



1. An apparatus for producing mineral fibers from a melt of silicate materials having a modular modulus of viscosity of at least 1.4 by blast drawing, said apparatus comprising:

a melt tank for holding said molten silicate materials;

at least one distributor tank in flow communication with said melt tank, said distributor tank having a plurality of exit orifices for forming primary filaments of melt, said orifices having cross-sectional areas in the range of from 1.5 to 3.5 mm^2;

a blast nozzle unit disposed beneath said exit orifices at a distance therefrom, in flow communication therewith for receiving said primary filaments, and symmetrical relative to the plumb line of said primary filaments emerging from said exit orifices, said nozzle unit comprising two blast nozzle halves bounding a nozzle slot therebetween to accomodate a plurality of parallel incoming primary filaments, each of said halves having a blow-in slit pointing downwardly into said nozzle slot for introducing propellant gas into said slot, said slits being arranged at the same level in said nozzle halves and at a vertical distance of between 8 mm and 15 mm below said exit orifices;

said nozzle slot having a horizontal width between 6 mm and 15 mm and a vertical length between 5 mm and 80 mm;

a vertical chute arranged beneath said blast nozzle unit to receive fibers emerging therefrom; and

a conveyor belt arranged beneath said chute to receive fibers emerging therefrom and transport away a continuous web of fibers.

4,698,087

TAKE-OUT MECHANISM FOR A GLASSWARE FORMING MACHINE

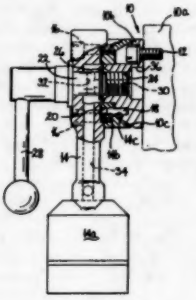
Walter Hirt, Buelach, Switzerland, assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Sep. 19, 1986, Ser. No. 910,047

Claims priority, application United Kingdom, Sep. 21, 1985, 8523370

Int. Cl.⁴ C03B *9/44*

U.S. Cl. 65—172 **4 Claims**



1. A glassware forming machine comprising:

support means having a threaded bore therein,

tong carrier means including an upper portion to be secured to said support means,

a through bore defined in said upper portion having a first portion and an axially adjacent enlarged portion defining a flange portion therebetween,

fastening means having

a threaded portion at one end for threaded insertion into said support means threaded bore,

rotatable means at the other end adapted to be rotated to threadedly insert said threaded portion into said threaded bore,

a cylindrical portion intermediate said threaded portion and said rotatable means for sliding displacement within said first through bore portion,

a first enlarged portion between said threaded and cylindrical portions for engaging said flange portion thereby limiting the displacement of said cylindrical portion relative to said first through bore portion in one direction,

a second enlarged portion at the other end of said cylindrical portion for engaging said tong carrier upper portion thereby limiting the displacement of said cylindrical portion in the opposite direction relative to said through bore portion, and

said cylindrical portion having a length selected so that when said rotatable means is rotated to insert said threaded portion into said threaded bore, said tong carrier will be secured to said support means.

4,698,088

GLASS PLATE FABRICATION MACHINE UNDER AUTOMATIC CONTROL

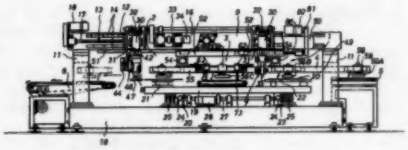
Shigeru Bando, Tokushima, Japan, assignor to Bando Kiko Co., Ltd., Tokushima, Japan

Filed Sep. 30, 1986, Ser. No. 913,380

Claims priority, application Japan, Sep. 30, 1985, 60-218851

Int. Cl.⁴ C03B *33/02*

U.S. Cl. 65—174 **1 Claim**



1. A glass plate fabrication machine comprising:

a cutting station for forming a score-cutting line to a raw glass plate for cutting said plate,

a cracking station for automatically cracking said raw glass plate along with the cutting line,

a grinding station for grinding an edge of the cracked glass plate,

a glass plate conveying device for conveying said glass plate sequentially through the cutting station, the cracking station and the grinding station, and

control means connected to said cutting station and said grinding station respectively for controlling each of them in common,

and connected to the cracking station so that said cracking station conducts relevant operation during interlocking operations of said cutting station and said grinding station.

4,698,089

OPTICAL ELEMENT FORMING APPARATUS

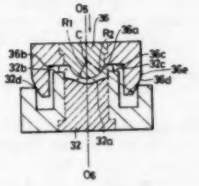
Kenzo Matsuzaka, Kawasaki; Seitaro Okano, Tokyo, and Nobuo Nakamura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 570,835, Jan. 16, 1984, abandoned. This application Sep. 10, 1985, Ser. No. 774,395

Claims priority, application Japan, Jan. 28, 1983, 58-13554; Aug. 29, 1983, 58-156494; Sep. 13, 1983, 58-167531

Int. Cl.⁴ B29D *11/00*

U.S. Cl. 65—290 **2 Claims**



1. A forming apparatus for molding an optical glass lens having at least one aspherical functional surface and a flange portion, said apparatus comprising, in combination for molding, a first, fixed mold member and a second, movable mold member that can be positioned with respect to the first mold member to cooperatively mold an optical glass lens, wherein said first mold member comprises:

an aspherical molding surface of said first mold member for forming an aspherical surface of the optical glass lens,

a flange forming surface of said first mold member extending from the outer periphery of said aspherical molding surface; and

an edge portion of said first mold member extending from the outer periphery of said flange forming surface, wherein said second mold member comprises:

a spherical molding surface of said second mold member having a radius R_1 for forming a functional surface of the optical glass lens,

a flange forming surface of said second mold member adjacent to and extending from the periphery of said spherical molding surface for cooperating with said flange forming surface of said first mold member to form the flange portion of the optical glass lens, and

an aligning spherical surface of said second mold member extending from the periphery of said flange forming surface of said second mold member and having a center identical to that of said spherical molding surface and having a radius different from that of said spherical molding surface, wherein said aligning spherical surface of said second mold member is structured such that it will engage with said edge portion of said first mold member by movement of said second mold member to determine the distance between said first and second mold members for forming the functional surfaces and the flange portion of the optical glass lens, and wherein said flange forming surfaces are not of spherical curvature and provide a lens flange whose curvature is not spherical.

4,698,090

PROCESS FOR PREPARATION OF COMPOSITIONS FOR MODIFYING PLANT GROWTH; COMPOSITIONS FOR PLANT GROWTH MODIFICATION; AND METHOD FOR THE USE THEREOF

John R. Marihart, Fresno, Calif., assignor to Pacific Micro Minerals, Inc., Fresno, Calif.

Continuation-in-part of Ser. No. 609,778, May 14, 1984, abandoned. This application Aug. 30, 1985, Ser. No. 771,554

Int. Cl.[4] **C05F** *11/02*

U.S. Cl. 71—24 **24 Claims**

1. A process for preparing a liquid composition for modifying plant growth comprising the steps of heating an aqueous reaction medium to a temperature in the range of from about 170° F. to about 225° F.; adding leonardite ore to the aqueous reaction medium; adding at least one member of the group consisting of the sodium, potassium, ammonium, copper, iron, magnesium, manganese, zinc, calcium, lithium, rubidium and cesium salts of gluconic acid, glucoheptoic acid, citric acid, tartaric acid, tartronic acid, galactaric acid, glucaric acid, glutaric acid, and glutamic acid to the reaction medium; mixing the aqueous medium for a period of time sufficient to permit reaction thereamong; and permitting the reacted mixture to settle to effect a separation thereof into the liquid composition for modifying plant growth and a solid phase of excess solid matter.

4,698,091

2-PHENYLPYRIMIDINES, 2-NAPHTHYLPYRIMIDINES AND 2-HETEROCYCLYLPYRIMIDINES AS SAFENERS FOR PROTECTING CULTIVATED PLANT AGAINST PHYTOTOXIC DAMAGE CAUSED BY HERBICIDES

Hans-Georg Brunner, Lausen; Kurt Burdeska, and Werner Föry, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 499,603, May 31, 1983, abandoned. This application Jul. 3, 1985, Ser. No. 752,475

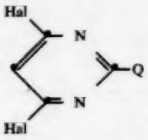
Claims priority, application Switzerland, Jun. 8, 1982, 3526/82; Jun. 21, 1982, 3795/82; Nov. 16, 1982, 6665/82

The portion of the term of this patent subsequent to Jan. 15, 2001, has been disclaimed.

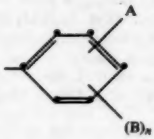
Int. Cl.[4] **A01N** *57/10, 43/48;* **C07D** *239/02*

U.S. Cl. 71—87 **4 Claims**

3. A method of protecting plants of cereal, rice, sorghum or soybean from the harmful action of a herbicide of the classes chloracetanilides, triazinones or pyridyloxy-phenoxy propionates, which comprises the use of an effective amount of a 2-phenylpyrimidine, 2-naphthyl-pyrimidine or 2-heterocyclyl-pyrimidine of the formula



wherein Q is



or a heterocyclic ring which is furan, pyran, thiophene, thiazole, pyridine, pyrroline, oxazole, isoxazole, thioxazole, isothiazole, thiadiazole, oxthiazole, pyrrole, imidazole, pyrazole, pyrazine, pyrimidine, pyridazine, 1,3,5-triazine, 1,2,4,-triazine, 1,2,4-triazole, 1,2,3-triazole, 1,3,4-triazole, oxdiazole, oxazine, furazane, pyridine-N-oxide, thiophene-5-oxide, benzthiophene, benzofuran, pyridine-N-oxide, thiophene-5-oxide, benzthiophene, isobenzofuran, chromene, chromane, indole, isoindole, indazole, quinoline, isoquinoline, phthalazine, quinoxaline, quinazoline, cinnoline, benzthiazole and benzimidazole and which is unsubstituted or substituted by one or two of halogen, nitro, cyano, XR_3, $COOR_3$, SO_3H or $SO_2NR_3R_4$, C_1-C_6-alkyl, C_2-C_6-alkenyl or C_2-C_6alkynyl;

A is a radical R_1, XR_1, COR_1 or $XCOR_1$, C_1-C_6-alkyl substituted by R_1 or XR_1, C_2-C_6-alkenyl substituted by cyano, R_1, XR_1COR_1 or COR_2, or C_2-C_6-alkynyl substituted by R_1 or XR_1, or is a radical $—OCONR_8R_9$, OSO_2R_9 or $—NR_3—SO_2R_9$,

X is oxygen, sulfur, or the —SO— or $—SO_2—$ group,

R_1 is a phenyl radical or an unsaturated heterocyclic radical which is unsubstituted or substituted by halogen, C_1-C_4-alkyl,

C_1-C_4-haloalkyl, nitro, cyano or X-C_1-C_4-alkyl,

R_2 is hydrogen, C_1-C_6-alkyl which is unsubstituted or substituted by hydroxy, C_1-C_6-alkoxy, $—COR_2$, $—NR_3R_4$, or is C_2-C_6-alkenyl or C_2-C_6-alkynyl,

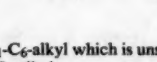
R_3 and R_4, each independently of the other, is hydrogen,

C_1-C_6-alkyl which is unsubstituted or unsubstituted by hydroxyl,

C_1-C_6-alkoxy, $—COR_2$ or $—NR_3R_4$, or is C_2-C_6-alkenyl or C_2-C_6-alkynyl; or

R_3 and R_4 together form a 4 to 6-membered alkylene chain which may be interrupted by oxygen, sulfur, the imino group or a C_1-C_4-alkylimino group; and

A is also a radical $—N{=}CR_1R_5$ or



wherein

R_5 is hydrogen, C_1-C_6-alkyl which is unsubstituted or substituted by X-C_1-C_6-alkyl,

R_6 is hydrogen or C_1-C_6-alkyl, or is a pyrryl, piperazyl, imidazolyl or triazolyl radical which is bound through nitrogen and is unsubsituted or substituted by C_1-C_4-alkyl or halogen, or is a radical $—NR_3R_7$ or R_1, or R_7 is a R_1, COR_1, $XCOR_1$, C_1-C_6-alkyl or C_3-C_6-cycloalkyl group, each substituted by halogen, hydroxyl, C_1-C_6-alkoxy, C_1-C_6-alkylthio, $—NR_3R_4$ or R_1, or

R_3 and R_7 together form a 4- 6-membered alkylene chain which may be interrupted by oxygen, sulfur, the imino group or a C_1-C_4-alklimino group,
R_8 is hydrogen C_1-C_6-alkyl, C_3-C_6-alkenyl, C_3-C_6-alkynyl, C_1-C_6-alkoxy, C_3-C_6-alkenyloxy or C_3-C_6-alkynyloxy,
R_9 has the same meaning as R_1 or is C_1-C_4-alkyl, C_1-C_6-haloalkyl, C_3-C_6-alkenyl or C_3-C_6-alkynyl,
B is hydrogen, halogen, nitro, cyano, an XR_2, NR_3R_4, C_1-C_6-alkyl or C_3-C_6-cycloalkyl group each unsubstituted or substituted by halogen or XR_2, or is C_2-C_6-alkenyl or C_2-C_6-alkynyl; or
A and B together form a 3- 4-membered chain, the members of which are formed by oxygen, a —CH_2—, —CH=, with the proviso that two oxygen atoms are not directly adjacent ring members,
n is 0 or 1, and
Hal is halogen.

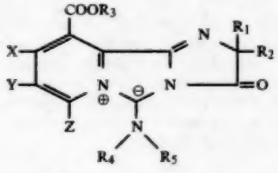
4,698,092

5H-IMIDAZO[2',1':4,3]IMIDAZO-[1,5A]PYRIDIN-6-IUM SALTS AND THEIR USE AS HERBICIDAL AGENTS

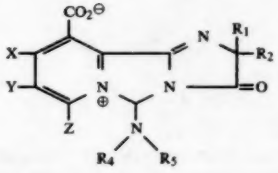
Marinus Los, Pennington, N.J., assignor to American Cynamid Company, Stamford, Conn.

Filed Jan. 24, 1986, Ser. No. 822,098
Int. Cl.[4] A01N *43/40*; C07D *471/14, 221/00*
U.S. Cl. 71—92 **12 Claims**

1. (2-imidazolin-2-yl)pyridine and quinolinecarboxylic acid and ester inner salts and ylides, having the structure



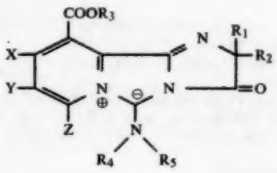
II



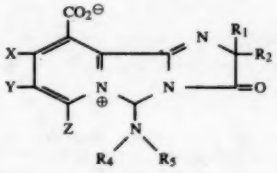
III

wherein
X is H, halogen or methyl;
Y and Z are each hydrogen, halogen, C_1–C_6 alkyl, hydroxyloweralkyl, C_1–C_6 alkoxy, C_1–C_4 alkylthio, phenoxy, C_1–C_4 haloalkyl, nitro, cyano, C_1–C_4 alkylamino, diloweralkylamino or C_1–C_4 alkylsulfonyl group, or phenyl optionally substituted with one C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen, difluoromethoxy, trifluoromethoxy, 1,1,2,2-tetrafluoroethoxy, C_3–C_8 straight or branched alkenyloxy optionally substituted with one to three halogens, or C_3–C_8 straight or branched alkynyloxy optionally substituted with one to three halogens;
and when taken together, Y and Z may form a ring, in which YZ are represented by —$(CH_2)_n$—, where n is an integer of 3 or 4, or —$(CH)_4$—;
R_1 is C_1–C_4 alkyl;
R_2 is C_1C_4 alkyl or C_3–C_6 cycloalkyl; and when R_1 and R_2 are taken together with the carbon to which they are attached they may represent C_3–C_6 cycloalkyl optionally substituted with methyl;
R_3 is hydrogen or loweralkyl optionally substituted by phenyl;
R_4 and R_5 are each C_1–C_4 alkyl or phenyl, or when taken together, may form a piperidine or pyrrolidine ring;
and when R_1 and R_2 are not the same the optical isomers thereof.

10. A method for control of monocotyledonous and dicotyledonous annual, perennial and aquatic plant species comprising: applying to the foliage of said plants or to soil or water containing seeds or other propagating organs thereof, a herbicidally effective amount of a compound having a structure:



II



III

wherein
X is H, halogen or methyl;
Y and Z are each hydrogen, halogen, C_1–C_6 alkyl, hydroxyloweralkyl, C_1–C_6 alkoxy, C_1–C_4 alkylthio, phenoxy, C_1–C_4 haloalkyl, nitro, cyano, C_1–C_4 alkylamino, diloweralkylamino or C_1–C_4 alkylsulfonyl group, or phenyl optionally substituted with one C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen, difluoromethoxy, trifluoromethoxy 1,1,2,2-tetrafluoroethoxy, C_3–C_8 straight or branched alkenyloxy optionally substituted with one to three halogens, or C_3–C_8 straight or branched alkynyloxy optionally substituted with one to three halogens;
and when taken together, Y and Z may form a ring, in which YZ are represented by —$(CH_2)_n$—, where n is an integer of 3 or 4, or —$(CH)_4$—;
R_1 is C_1–C_4 alkyl;
R_2 is C_1C_4 alkyl or C_3–C_6 cycloalkyl; and when R_1 and R_2 are taken together with the carbon to which they are attached they may represent C_3–C_6 cycloalkyl optionally substituted with methyl;
R_3 is hydrogen or loweralkyl optionally substituted by phenyl;
R_4 and R_5 are each C_1–C_4 alkyl or phenyl, or when taken together, may form a piperidine or pyrrolidine ring;
thereof and when R_1 and R_2 are not the same the optical isomers thereof.

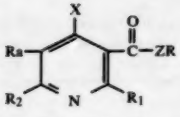
4,698,093

HERBICIDAL (2 OR 6)-FLUOROALKYL-4-AMINO PYRIDINE DERIVATIVES

Len F. Lee, St. Charles, and Maria L. Miller, Manchester, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 668,929, Nov. 6, 1984, abandoned. This application Aug. 27, 1985, Ser. No. 768,659
Int. Cl.[4] C07D *213/80, 401/04, 405/12*; A01N *43/40*
U.S. Cl. 71—94 **83 Claims**

1. A compound represented by the formula

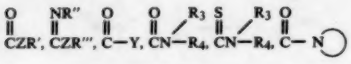


wherein:

R is selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, cyanoalkyl, alkoxyalkyl, haloalkyl, haloalkenyl benzyl, and a cation, and Z is selected from O and S;

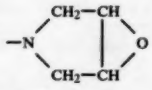
R_1 and R_2 are independently selected from fluorinated methyl, chlorofluorinated methyl, fluorinated ethyl, and lower alkyl provided that R_1 and R_2 cannot both be lower alkyl radicals;

Ra is selected from



radicals wherein R′ is selected from hydrogen, lower alkyl, lower alkenyl, lower alkynyl, cyanoalkyl, alkoxyalkyl, haloalkyl, haloalkenyl, benzyl and a cation; R″ and R‴ are independently selected from lower alkyl, lower alkenyl, lower alkynyl, cynaoalkyl, alkoxyalkyl, haloalkyl, and haloalkenyl provided that R‴ may also be hydrogen; R_3 and R_4 are in each occurrence independently selected from hydrogen, lower alkyl substituted or unsubstituted phenylalkyl lower alkenyl, lower alkynyl, haloalkyl, and haloalkenyl; Y is a halogen selected from F, Cl, and Br; and

is selected from the group consisting of aziridinyl, piperidinyl, azetidinyl, pyrrolidinyl, hexahydro-azepinyl, imidazolyl, pyrrolyl, triazolyl, pyrazolylmorpholino, and

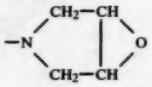


optionally substituted with a lower alkyl radical and;

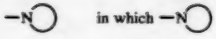
X is selected from

(d)

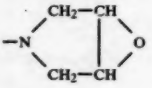
in which R_7 is selected from hydrogen, lower alkyl, lower haloalkyl, lower alkenyl, lower alkynyl, and haloalkenyl; and R_8 is selected from hydrogen, lower alkyl, lower haloalkyl, lower alkenyl, haloalkenyl, lower alkynyl, phenyl, benzyl, cyanoalkyl, dialkylamino, haloacetyl, C_3–C_6 halocycloalkylcarbonyl, alkoxycarbonylalkyl, alkoxy, C_3–C_6 cycloalkyl, C_3–C_6 cycloalkylalkyl, 3- to 6-membered ring saturated and unsaturated heterocyclic alkyl selected from furanyl and tetrahydrofuranyl and 3–6 membered ring saturated heterocycle selected from the group consisting of aziridinyl, piperidinyl, azetidinyl, pyrrolidinyl, hexahydroazepinyl, imidazolyl, pyrrolyl, triazolyl, pyrazolyl, morpholino, and



(e)

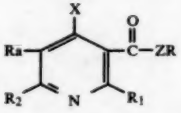


is a nitrogen containing saturated or unsaturated heterocyclic ring moiety selected from the group consisting of aziridinyl, piperidinyl, azetidinyl, pyrrolidinyl, hexahydroazepinyl, imidazolyl, pyrrolyl, triazolyl, pyrazolyl, morpholino, and



where in each occurrence of substituted phenyl the substituents are selected from the group consisting of halogen atoms, nitro, lower alkyl, lower alkoxy, lower haloalkyl, lower haloalkoxy, and carboalkoxy groups.

73. A method of controlling undesired vegetation comprising applying to the plant locus an effective amount of a compound represented by the formula

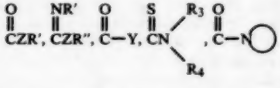


wherein:

R is selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl, cyanoalkyl, alkoxyalkyl, haloalkyl, and haloalkenyl; and Z is selected from O and S;

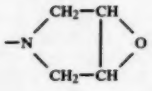
R_1 and R_2 are independently selected from fluorinated methyl, chlorofluorinated methyl, fluorinated ethyl, and lower alkyl provided that R_1 and R_2 cannot both be lower alkyl radicals;

Ra is selected from



radicals wherein R′ is selected from lower alkyl, lower alkenyl, lower alkynyl, cyanoalkyl, alkoxyalkyl, haloalkyl, haloalkenyl and a cation; R″ and R‴ are independently selected from lower alkyl, lower alkenyl, lower alkynyl, cyanoalkyl, alkoxyalkyl, haloalkyl, and haloalkenyl provided that R″ may also be hydrogen; R_3 and R_4 are independently selected from hydrogen, lower alkyl, substituted or unsubstituted phenylalkyl lower alkenyl, lower alkynyl, haloalkyl, and haloalkenyl; R_3 and R_4 are independently selected from hydrogen and lower alkyl; Y is a halogen selected from F, Cl, and Br; and

is a selected from the group consisting of aziridinyl, piperidinyl, azetidinyl, pyrrolidinyl, hexahydroazepinyl, imidazolyl, pyrrolyl, triazolyl, pyrazolyl, morpholino, and

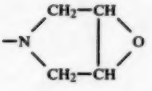


optionally substituted with a lower alkyl radical and;

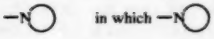
X is selected from

(c)

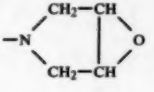
in which R_7 is selected from hydrogen, lower alkyl, lower haloalkyl, lower alkenyl, lower alkynyl, and haloalkenyl; and R_8 is selected from hydrogen, lower alkyl, lower haloalkyl, lower alkenyl, haloalkenyl, lower alkynyl, cyanoalkyl, dialkylamino, alkoxycarbonylalkyl, C_3–C_6 halocycloalkylcarbonyl, alkoxy, C_3–C_6 cycloalkyl, C_3–C_6 cycloalkylalkyl, 3–6 membered ring saturated and unsaturated heterocyclic alkyl selected from furanyl and tetrahydrofuranyl and 3–6 ring saturated heterocycles selected fromt he group consisting of aziridinyl, piperidinyl, azetidinyl, pyrrolidinyl, hexahydroazepinyl, imidazolyl, pyrrolyl, triazolyl, pyrazolyl, morpholino, and



(d)



is a nitrogen containing saturated or unsaturated heterocyclic ring moiety selected from the group consisting of azirindinyl, piperidinyl, azetidinyl, pyrrolidinyl, hexahydroazepinyl, imidazolyl, pyrrolyl, triazolyl, pyrazolyl, morpholino, and



and optionally substituted with one or more groups selected from lower alkyl and epoxy;

where in each occurrence of substituted phenyl the substituents are selected from the group consisting of halogen atoms, nitro, lower alkyl, lower alkoxy, lower haloalkyl, lower haloalkoxy, and carboalkoxy groups.

4,698,094

2-NITRO-5-(2'CHLORO-4'TRIFLUOROMETHYL-PHENOXY)-PHENYLACETIC ESTERS, HERBICIDAL COMPOSITION, AND METHOD FOR DESTRUCTION OF UNDESIRABLE WEEDS

Yoshiharu Hayashi, and Hiroyuki Kouji, both of Yokohama, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

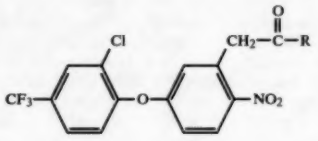
Filed Apr. 22, 1985, Ser. No. 725,537

Claims priority, application Japan, May 18, 1984, 59-100061; May 18, 1984, 59-100062; May 18, 1984, 59-100063; May 21, 1984, 59-102372

Int. Cl.[4] A01N *37/40;* **C07C** *79/46*

U.S. Cl. 71—108 **17 Claims**

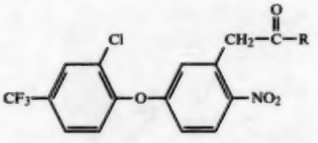
1. A compound represented by the formula



(I)

wherein R represents —OR^1 in which R^1 represents a straight or branched alkyl group substituted with at least one member selected from the group consisting of a hydroxyl group and a hydrocarbyloxy group, or a straight or branched alkyl group substituted with at least one member selected from the group consisting of a carboxyl group and a group functionally derived therefrom.

16. A method for the destruction of undesirable weeds, which comprises applying to said weeds a herbicidally effective amount of a compound represented by the formula



(I)

wherein R represents —OR^1 in which R^1 represents a straight or branched alkyl group substituted with at least one member selected from the group consisting of a hydroxyl group and a hydrocarbyloxy group, or a straight or branched alkyl group substituted with at least one member selected from the group consisting of a carboxyl group and a group functionally derived therefrom as such or in the form of a herbicidal composition comprising said compound of formula (I) as an active ingredient and an agriculturally acceptable carrier.

4,698,095

COMPOSITE CALCIUM CLADS FOR TREATING MOLTEN IRON

Tohei Ototani, No. 10-505, Daiichi-Chiku, Kawauchi, Sendai, and Yasuji Kataura, both of Sendai City, Japan, assignors to Tohei Ototani, Japan

Continuation of Ser. No. 802,955, Nov. 27, 1985, which is a continuation of Ser. No. 746,465, Jun. 20, 1985, abandoned, which is a continuation of Ser. No. 658,073, Oct. 5, 1984, abandoned, which is a continuation of Ser. No. 233,254, Feb. 10, 1981, abandoned, which is a continuation of Ser. No. 929,050, Jul. 28, 1978, abandoned, which is a continuation of Ser. No. 285,703, Apr. 7, 1977, abandoned, which is a continuation of Ser. No. 598,477, Jul. 23, 1975, Pat. No. 4,035,892, which is a continuation-in-part of Ser. No. 374,431, Jun. 28, 1973, abandoned. This application May 29, 1986, Ser. No. 868,387

Claims priority, application Japan, Jun. 30, 1972, 47-65757; Dec. 27, 1972, 48-1615

The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.

Int. Cl.[4] C21C *7/02*

U.S. Cl. 75—58 2 Claims

1. A compressed and deformed composite clad wire for effectively deoxidizing molten metal, said composite wire consisting essentially of

(1) a solidified integral elongated metallic calcium-containing core, encased in

(2) a sheath of iron or an alloy thereof, with said core being 10–90% by weight based on the composite wire, and

with said core material and said sheath having been subjected together, after insertion of the core material into the sheath, to mechanical compression and deformation applied to a direction substantially perpendicular to the longitudinal axis of the sheath so as to reduce the cross-sectional area of said composite wire and substantially increase the resistance of said composite wire to failure under bending when fed into a molten metal in a ladle, and to thereby enhance the capability of said composite wire for being continuously and mechanically fed to the bottom region of a molten metal in a ladle so as to introduce into said molten metal an amount of said core material effective to deoxidize said molten metal.

4,698,096

SINTERING PROCESS

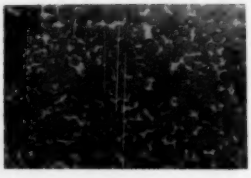
Rainer Schmidberger, Reussenbachstrasse 33, and Sylvia Härdtle, Bernhardstrasse 43/2, both of 7778 Markdorf, Fed. Rep. of Germany

Filed Oct. 21, 1985, Ser. No. 789,479

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1985, 3438547

Int. Cl.[4] C22C *1/04*

U.S. Cl. 75—248 13 Claims



1. A process for preparing a sintered part having a high tungsten content, which comprises the steps of:

(a) sintering a porous part of pressed tungsten alloy powders having a high tungsten content in solid phase, and

(b) heat treating the sintered part from step (a) in a liquid phase for 2 to 10 minutes.

4,698,097

NET ANTIFOULING COMPOSITION

Richard J. Gulgielmo, Sr., Cresskill, N.J., assignor to EMA Company, Cresskill, N.J.

Continuation-in-part of Ser. No. 888,373, Mar. 20, 1978, Pat. No. 4,393,102, and a continuation-in-part of Ser. No. 341,275, Jan. 21, 1982, abandoned. This application Jun. 27, 1983, Ser. No. 508,520

Int. Cl.[4] C09D *5/14*

U.S. Cl. 106—15.05 1 Claim

1. An antifouling composition comprised of a tri-n-butyl tin ester selected from the group consisting of tri-n-butyl tin linoleate, bis(tri-n-butyl) tin succinate, tri-n-butyl tin benzoate, tri-n-butyl tin salicylate and mixtures thereof in an amount of from 2 to 10 percent by weight in a resin system dissolved in a solvent system wherein the resulting mixture yields a solids content of from 20% to about 50% solids by weight.

4,698,098

METHOD OF PRODUCING AN ALGAE GROWTH-REPELLENT UNDERWATER COATING AND THE RESULTANT PRODUCT

Helmut Gansloser, Constance, and Benjamin Nissenbaum, St. Leonhardsweg, D-775 Konstanz, both of Fed. Rep. of Germany, assignors to Benjamin Nissenbaum, Constance, Fed. Rep. of Germany

Filed Sep. 24, 1982, Ser. No. 422,682

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1982, 3222089; Aug. 16, 1982, 3230536

Int. Cl.[4] C09D *5/14*

U.S. Cl. 106—18.36 13 Claims

1. A method of producing a paint for use in an aqueous environment for preventing the growth of algae comprising providing an underwater paint and adding to said underwater paint a zinc-bearing additive selected from the group consisting of $(CN)_6$-complex salts of hydrocyanic acid.

4,698,099

PIGMENT COMPOSITION

Michiei Nakamura, Soka; Hitoshi Takeuchi, Saitama; Tetujiro Takahashi; Minoru Takizawa, both of Koshigaya, and Shojiro Horiguchi, Omiya, all of Japan, assignors to Dainichiseika Color & Chemicals MFG. Co., Ltd., Tokyo, Japan

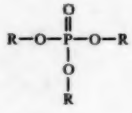
Filed Jan. 23, 1986, Ser. No. 824,576

Claims priority, application Japan, Feb. 21, 1985, 60-033493; Sep. 25, 1985, 60-210293

Int. Cl.[4] C04B *14/00*

U.S. Cl. 106—288 R 6 Claims

1. A pigment composition composed of a pigment and a dispersant characterized in that the dispersant is a phosphoric ester compound represented by the formula



where at least one R is a polyester residue derived from a hydroxy-terminated polyester obtained by self-polycondensation of a hydroxy-carboxylic acid, and any remaining R is a hydrogen atom, a cation, or a residue of an alcohol.

4,698,100

IRON OXIDE YELLOW PIGMENTS HAVING A LOW SILKING EFFECT AND A PROCESS FOR PRODUCTION THEREOF

Wilfried Burow; Helmut Printzen; Horst Brunn, and Klaus Nollen, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 629,654, Jul. 11, 1984, Pat. No. 4,620,879. This application Apr. 16, 1986, Ser. No. 852,598

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1983, 3326632

The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.

Int. Cl.[4] C09C *1/24*

U.S. Cl. 106—304 **2 Claims**

1. Iron oxide yellow pigments having a silking effect of 0.5 or less and having color values which have CIELAB units in the range of from 52 to 63 for L*, from 8 to 14 for a* and from 40 to 48 for b*, measured according to German Industrial Standard 6174 at a 10% pigment volume concentration (PVC) in a medium oil-length alkyd resin having an oil content of 48% and based on natural fatty acids.

4,698,101

BINDER-DILUENT COMPOSITION AND METHOD

Juha A. Koivurinta, Helsinki, Finland, assignor to Suomen Sokeri Oy (Finnish Sugar Company Ltd.), Finland

Continuation-in-part of Ser. No. 412,804, Aug. 30, 1982, abandoned. This application Mar. 6, 1985, Ser. No. 708,599

Int. Cl.[4] C13F *3/00*; A23G *3/00*

U.S. Cl. 127—30 **8 Claims**

1. A fructose-based dry binder-diluent for use in making direct compression tablets comprising a plurality of compressible free-flowing granules having a mean particle size in the range of about 0.15–0.60 mm, the granules having been formed by agglomeration of pulverized crystalline fructose with a maltose-containing syrup, followed by drying, and the granules containing by weight about 80–98% of fructose, about 2–20% disaccharide and up to 1.0% water.

4,698,102

PROCESS FOR PRODUCING, BY CONTINUOUS ANNEALING, SOFT BLACKPLATE FOR SURFACE TREATMENT

Kuniaki Maruoka; Nobuyuki Takahashi; Senkichi Tujimura; Yasuhiko Yamashita; Setsuo Otsuka; Isao Oohasi, and Takeo Motoyama, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jul. 3, 1985, Ser. No. 752,083

Claims priority, application Japan, Jul. 9, 1984, 59-140692; Jul. 13, 1984, 59-145706; Jul. 18, 1984, 59-147668

Int. Cl.[4] C21D *8/02*

U.S. Cl. 148—2 **6 Claims**

1. A process for producing a soft blackplate for surface treatment, comprising the steps of:

obtaining an aluminum-killed steel containing, by weight percentage, from 0.01% to 0.08% of carbon, from 0.05% to 0.60% of manganese, 0.02% or less of phosphorus, from 0.005% to 0.10% of acid-soluble aluminum, and 0.01% or less of nitrogen, the balance being essentially iron;

forming a slab of the aluminum-killed steel by continuous casting or ingot-making followed by rough-rolling;

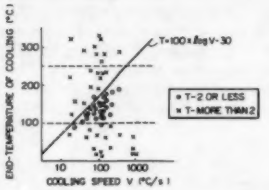
heating the slab to a temperature of 950° C.–1240° C.;

hot-rolling the heated slab to form a strip;

coiling the strip at a temperature of from 620° C. to 710° C.;

cold-rolling the hot-rolled strip to form a cold-rolled strip;

continuously annealing the cold-rolled strip, wherein soaking is carried out at a temperature of from Ac_1 to 800° C.



followed by slow cooling at a speed of 20° C. or less down to a temperature of from 650° C. to 730° C., and then cooling at a cooling speed (V/°C./sec) of 30° C./sec or more down to an end temperature range of from 100° C. to 250° C. but not higher than a temperature determined by $(100 \times \log V - 30)$°C. and then reheating the strip to an overaging treatment temperature of from 250° C. to 450° C. and subjecting the strip to said overaging treatment temperature of from 250° C. to 450° C. for 30 seconds or more; and

skin-pass rolling at a draft of from 0.2% to 6.0%.

4,698,103

METHOD OF MANUFACTURING DUAL PHASE STRIP STEEL AND STEEL STRIP MANUFACTURED BY THE METHOD

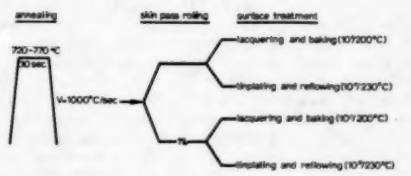
Thomas M. Hoogendoorn, Aerdenhout; Maarten A. de Haas, Heerhugowaard, and Johan M. Nijman, Bergen, all of Netherlands, assignors to Hoogovens Groep B.V., Ijmuiden, Netherlands

Filed Mar. 10, 1986, Ser. No. 837,195

Claims priority, application Netherlands, Mar. 8, 1985, 8500658

Int. Cl.[4] C21D *8/02*

U.S. Cl. 148—12 F **18 Claims**



1. A method of manufacturing a dual phase steel in the form of a strip of thickness in the range 0.1 to 0.5 mm from an unalloyed low C, low Mn steel composition having by weight

0.02–0.15% C

0.15–0.50% Mn

comprising the steps of

hot rolling

cold rolling

continuous annealing

the said continuous annealing comprising

(a) heating the strip to a temperature not exceeding 770° C. in the A_1–A_3 region of the iron-carbon diagram and soaking it at said temperature and thereafter

(b) cooling the strip at a rate sufficiently rapid that austenite is at least partly converted to martensite and/or bainite, said cooling rate being such that the value P=d.V where d is the strip thickness in mm and V is the average cooling rate in °C./sec over the temperature range 700° to 300° C., is in the range 20 to 900,

wherein the time interval between the end of step (a) and the beginning of step (b) is less than 4 seconds.

4,698,104

CONTROLLED ISOTROPIC DOPING OF SEMICONDUCTOR MATERIALS

Robert A. Barker, Mountain View; Chuang C. Tsai, San Jose, and John C. Knights, Palo Alto, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 678,946, Dec. 6, 1984, abandoned. This application Mar. 2, 1987, Ser. No. 18,769

Int. Cl.[4] H01L *21/385*

U.S. Cl. 437—141 **14 Claims**

1. A method of doping selected areas of semiconductor material comprising the steps of

providing a substrate of semiconductor material having areas to be doped, said areas including contours comprising trenches and mesas,

then depositing, by means of plasma enhanced low pressure chemical vapor deposition, a predetermined thickness of a dopant carrier layer of amorphous semiconductor material including a predetermined amount of dopant therein, upon the substrate areas to be doped, the dopant carrier layer being substantially uniformly deposited to the same thickness over all the contours, said step of depositing being carried out at a temperature in the range of 20° C. to 600° C. so as to prevent the dopant from being driven out of said dopant carrier layer and into said areas to be doped, and subsequently

driving the dopant out of the carrier layer and into said areas to be doped in a controlled manner by annealing the substrate at a elevated temperature for a time sufficient to cause a predetermined amount of the dopan to enter said areas to be doped.

4,698,105

WATER-IN-OIL TYPE EMULSION EXPLOSIVES

Atsuo Inoue, Asa; Kazuhiro Miyamoto, Onoda; Nobuo Hisada, Moriyama, and Nobuyuki Okinaga, Kyoto, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1986, Ser. No. 946,789

Claims priority, application Japan, Jan. 14, 1986, 61-4250

Int. Cl.[4] C06B *45/00*

U.S. Cl. 149—2 **6 Claims**

1. A water-in-oil type emulsion explosive comprising an aqueous solution of oxidizing agent, an oily material, hollow microspheres, an emulsifier containing from 0.1 to 10% by weight of fatty acid, from 0.1 to 10% by weight of fatty acid soap and from 80 to 99.8% by weight of a fatty acid ester mixture comprising from 0 to 3% by weight of sorbide fatty acid ester and from 5 to 50% by weight of sorbitan fatty acid ester and from 50 to 95% by weight of sorbitol fatty acid ester.

4,698,106

METHOD FOR THE MANUFACTURE OF OXIDIZERS OF VERY LARGE SURFACE AREA AND THEIR USE IN HIGH BURNING RATE PROPELLANTS

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 16, 1971, Ser. No. 210,267

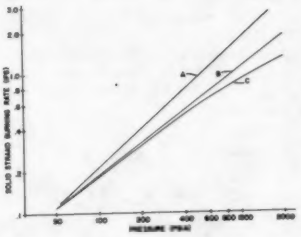
Int. Cl.[4] C06B *45/34*

U.S. Cl. 149—7 **3 Claims**

1. A method for the manufacture of ultrahigh-surface-area ammonium perchlorate comprising the steps of:

subjecting unground ammonium perchlorate to thermal shock by heating to about 150° C. and then cooling rapidly to yield thermally-shocked ammonium perchlorate;

treating said thermally shocked ammonium perchlorate with a selective extractant selected from ethanol, n-butanol, and mixtures of ethanol and butanol to perform multiple extractions for a predetermined period of time which causes the formation of indentations and/or cavities on the



surfaces of the thermally shocked ammonium perchlorate and crevasses and tunnels in the thermally-shocked ammonium perchlorate;

coating the ammonium perchlorate that has been treated by selective extractants with a n-hexane solution of divinylbenzene; and thereafter,

separating said ultrahigh-surface-area ammonium perchlorate.

4,698,107

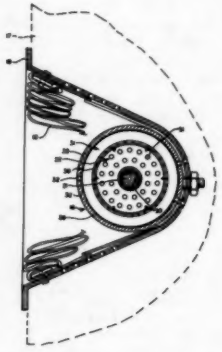
GAS GENERATING MATERIAL

George W. Goetz, Detroit, Mich., and Brian K. Hamilton, Littleton, Colo., assignors to TRW Automotive Products, Inc., Lyndhurst, Ohio

Filed Dec. 24, 1986, Ser. No. 946,705

Int. Cl.[4] C06B *45/34*

U.S. Cl. 149—7 **8 Claims**



1. Structure for generating gas, said structure comprising:

a grain made of an azide based material which generates gas upon combustion;

said grain having an ignition enhancing coating thereon comprising;

20 to 50% by weight of an alkali metal azide,

25 to 35% by weight of an inorganic oxidizer,

10 to 15% by weight of a fluoroelastomer binder,

15 to 25% by weight of magnesium, and

1 to 3% by weight of fumed silicon dioxide.

4,698,108

CASTABLE SMOKE-GENERATING COMPOUNDS EFFECTIVE AGAINST INFRARED

Jean F. Véga, Bourges, and Philippe C. Morand, Mehun/Yevre, both of France, assignors to Etat Francais, France

Filed Jun. 3, 1986, Ser. No. 869,894
Claims priority, application France, Jun. 7, 1985, 85 08603
Int. Cl.[4] C06B *45/02*
U.S. Cl. 149—21 8 Claims

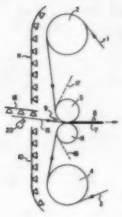
1. A castable pyrotechnic composition for producing opaque smoke for impeding the transmission of infrared radiation from a target to a sensor, consisting essentially of a condensed halogenated carbon compound with a melting point between 75° C. and 120° C. and having a halogenation ratio greater than 3, a fluorinated carbon compound and a metal powder, wherein the composition produces carbon particles having dimensions between 1 and 14 μm and reacts at a temperature of about 1500° C.

4,698,109

METHOD OF MAKING FLOATABLE SHEET MATERIAL

Stanley Lazar, Willowdale, Canada, assignor to Cantar Corporation, Canada

Division of Ser. No. 606,601, May 3, 1984, Pat. No. 4,628,549. This application Dec. 4, 1986, Ser. No. 938,040
Int. Cl.[4] B32B *31/00, 31/06, 31/08, 31/20*
U.S. Cl. 156—145 10 Claims



1. In a process for producing a floatable on water, translucent laminated sheet material by embossing a plastic film to form an embossed plastic film having a plurality of embossments dispersed thereon except at the longitudinal edges thereof, said embossments being spaced apart and separated by land areas between said embossments, and laminating to said embossed film a plastic backing film at the said longitudinal edges and at said land areas whereby air containing buoyant cells are formed by the embossments of the embossed film and the backing film, the improvement comprising laminating fibrous material to said sheet material between the embossed film and the backing film at least at the longitudinal edges thereof, whereby said edges are reinforced by the fibrous material and said edges may be attached to correspondingly reinforced edges of another said sheet material without substantially weakening the attached sheets of material at the attachments thereof.

4,698,110

PREPARATION OF FLUOROPOLYMER COATED MATERIAL

Eustathios Vassiliou, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

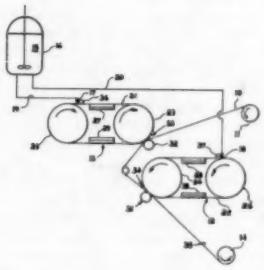
Filed Nov. 27, 1985, Ser. No. 802,229
Int. Cl.[4] B29B *1/16;* B32B *27/00;* D02G *3/00*
U.S. Cl. 156—231 7 Claims

1. A process for laminating a textile material with a polyvinyl fluoride film not thicker than 13 μm comprising:

preparing a polyvinyl fluoride dispersion from a polyvinyl fluoride resin and a latent solvent so as to have a solids content of from 5 to 50%, by weight,

coating a heated belt surface with said polyvinyl fluoride dispersion to a thickness that will give a dried film thickness not exceeding 13 μm while maintaining the belt surface temperature adequate to heat the dispersion to a temperature high enough to gel the dispersion but below the fusion temperature of the resin,

forming a gelled, coalesced polyvinyl fluoride film layer on the heated belt surface and maintaining contact with the heated belt surface long enough to remove enough of the



latent solvent to coalesce the polyvinyl fluoride layer to form a cohesive gel,

passing the textile material adjacent to the cohesive gel so that the cohesive gel adheres to the textile material, and

passing the textile material with the adhered cohesive gel into a nip point so as to form a laminate of the textile material with the adhered cohesive gel and heating said laminate to temperatures high enough to fuse said polyvinyl fluoride film layer.

4,698,111

VINYLIDENE CHLORIDE COMPOSITION AND FILM MADE THEREFROM

Marvin R. Havens, Greer, S.C., assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.

Division of Ser. No. 755,033, Jul. 15, 1985. This application Dec. 19, 1986, Ser. No. 944,481
Int. Cl.[4] B32B *27/08*
U.S. Cl. 156—244.11 7 Claims

1. A method of lowering the oxygen permeability and improving the thermal stability of a plasticized vinylidene chloride polymeric film comprising the steps of:

(a) preparing a mixture comprising a vinylidene chloride copolymer and epoxy resin;

(b) adding glycerin to said mixture to comprise 0.5% to 1.5% thereof;

(c) blending said mixture; and

(d) extruding the blended resin to form a film

4,698,112

PROCESS APPARATUS FOR MAKING DIFFERENTLY-SHAPED POLYETHYLENE BAGS AND THE METHOD THEREOF

Chang L. Chiang, 1 Fl., No. 2-1, Lane 16, Tung Hu Road, Nei Hu District, Taipei, Taiwan

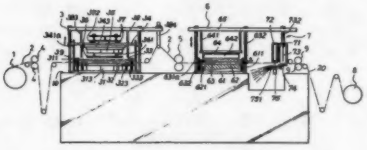
Filed Apr. 11, 1986, Ser. No. 850,523
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—250 2 Claims

1. An apparatus for making differently-shaped polyethylene (PE) bags comprising:

a store roller pre-rolled with a double-layer polyethylene sheet composed of two layers of polyethylene film, pertinent thereto a pair of input rollers provided for feeding said double-layer PE sheet into a heating-mold separating means;

a heating-mold separating means including:

a base plate mounted on a machine body of the apparatus having four standing rods respectively extending upwards from the four corners of said base plate, a lower mold having a heat-resistant plate mounted thereon formed on said base plate having a shape corresponding to that of a bag to be made, two outer mold plates each having a molding hole slightly larger than the shape of said lower mold and each resiliently mounted on said base plate above said lower mold of which said two outer mold plates are adapted for feeding said PE sheet therebetween, a fixing mold plate having a heat-resistant plate and a heating mold fixed thereunder to correspond said lower mold and slightly smaller in shape than that of the lower mold and having four apertures reciprocatively engaged with said four standing rods of said base plate and resiliently jacketed on four driving rods to be positioned above said two outer mold plates as lowerly limited by nuts fixed on each driving rod, a press plate adapted to downwards press the PE sheet for making a bag having a shape slightly smaller than that of the heating mold and protruding downwards said heating mold and having four rods upwards to pass through two securing plates partitioned with each other through two square holes formed on said fixing mold plate of which the lower securing plate is formed with four legs secured to said fixing mold plate, and an upper plate having a hole adapted for passing said securing plates when lowering the upper plate and fixed on the top ends of the four driving rods which are operatively reciprocatively mounted in the machine body whereby upon the lowering of said upper plate and the fixing mold plate, the heating mold will contact the PE



sheet as padded by the lower mold to thermally seal the contour of a bag, and having four press rods extending downwards from said upper plate to pass through said fixing mold plate to operatively depress said two outer mold plates downwards for separating boundary scrap from a thermally-sealed bag (scrap already clamped by two outer mold plates), and a U-shaped rod fixed on a right side of said heating-mold separating means adapted for slidably hanging the PE sheet leaving from said heating and lower molds;

a cutting-mold separating means including a base plate fixed on the machine body having four standing rods extending upwards from said base plate, a lower mold fixed on said base plate having a molding slot formed on its middle portion with a shape corresponding to a bag to be made, a press plate having a molding slot formed on its middle portion with a shape corresponding to a bag and jacketed on the four driving rods, which are operatively reciprocatively mounted in the machine body, as lowerly limited by four nuts each fixed on each driving rod under said press plate, an upper mold plate secured under an upper plate which is mounted on the top ends of said driving rods as restored by four springs each jacketed on each said driving rod as defined between said upper plate and said press plate and having a cutting mold formed on the bottom of said upper mold plate with a shape corresponding to a bag, whereby the PE sheet is fed through a pair of intermittently-operated transporting rollers to pass through said press plate and said lower mold to be cut for forming a bag except its root portion by said cutting mold upon the lowering of said upper plate and said upper mold plate; and

a collecting means including a n-shaped plate resiliently secured under said upper plate of said cutting-mold separating means as restored downwards by springs jacketed on two rods connected between said upper plate and a cutter reciprocatively moving within the n-shaped plate having cutting teeth formed on its lower end of said cutter, a base seat positioned under said cutter having a slot thereon corresponding to the cutting teeth of said cutter for cutting the root portion of a bag when lowering said cutter against said base seat, a rectangular-shape shell adjacent to said n-shaped plate having two apertures on its bottom, a collecting seat positioned under said rectangular-shaped shell and having two needles extending upwards from said shell adapted to poke a bag as passing through said shell and said collecting seat into said two apertures formed on said shell upon the lowering of said shell, for collecting the cut bags, and a scrap roller rolling up the scrap after removing the cut bags through a pair of intermittently-operated output rollers.

4,698,113

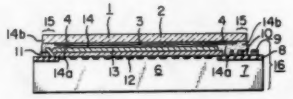
METHOD OF CURING PHOTOCURABLE AND HEAT-CURABLE COMPOSITIONS AND A METHOD OF ADHERING MEMBERS TO EACH OTHER BY USING THEM

Kazufumi Ogawa, Osaka, Japan, assignor to Matsushita Electric, Osaka, Japan

Continuation of Ser. No. 522,239, Aug. 11, 1983, abandoned. This application Apr. 8, 1985, Ser. No. 720,480

Int. Cl.[4] B32B *31/28*

U.S. Cl. 156—275.7 **14 Claims**



1. A method of adhering a color filter having a transparent region for passing light rays therethrough in at least a part thereof to a solid-state image sensor, wherein said filter and said sensor are maintained in accurate alignment during the adhering method, comprising superimposing said color filter on said solid-state image sensor with a photocurable and heat-curable adhesive sandwiched therebetween; aligning said color filter and said solid-state image sensor to form an assembly; irradiating said aligned assembly with light, to precure at least a part of the adhesive beneath said transparent region by means of light rays passing through said transparent region, to fix said color filter and solid-state image sensor in position; and while said filter and said sensor are fixed in accurate alignment, heating said assembly to thermally cure the adhesive.

4,698,114

APPARATUS FOR APPLYING STRIP REINFORCING TO SHEET MATERIAL

William F. Lowe, Bridgehampton, N.Y., assignor to E-Z Machine Corp., Plainview, N.Y.

Filed Feb. 14, 1986, Ser. No. 829,800

Int. Cl.[4] B32B *31/04, 31/18*

U.S. Cl. 156—353 **14 Claims**

1. An apparatus for applying a reinforcing strip to sheet material comprising:

means for feeding a succession of sheets of said sheet material along a path in a transport direction;

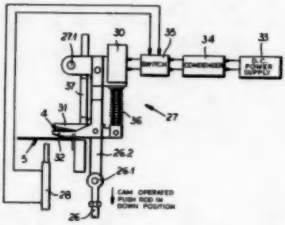
means along said path for applying said strip to a sheet advancing in the transport direction beginning substantially in alignment with a leading edge of said sheet;

a cutting device along said path for severing said strip while said strip is advancing in the transport direction so that a

trailing edge of said strip will not project beyond the trailing edge of said sheet, said cutting device comprising:

a lower cutting blade fitting between said strip and said sheet, over a portion of said strip before said strip meets said sheet,

an upper cutting blade juxtaposed with said lower blade above said strip and arranged so that said blade cuts said strip progressively inwardly from at least one edge,



solenoid means responsive to the trailing edge of said sheet for impulsively driving said upper blade toward said lower blade, and

an electric circuit including a capacitor for discharging through said solenoid means to impulsively actuate same; and

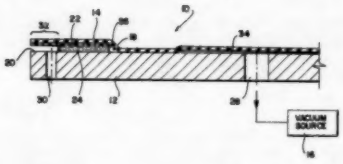
means operatively connected to said cutting device for shifting said upper and lower cutting blades into and out of the path of said strip.

4,698,115

SILICONE RUBBER VACUUM BAG TOOL AND METHOD OF FABRICATING SAME

John J. Dodds, Clifton Heights, Pa., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 28, 1984, Ser. No. 655,656
Int. Cl.[4] B25B *11/00*; B32B *33/00*
U.S. Cl. 156—382 **2 Claims**



1. A tool for use in applying pressure to a layup of composite material, comprising:

a base plate;

a silicone rubber bag in the form of a sheet having four edges, each edge having on the surface of said sheet facing the base plate a strip of silicone elastomer material adhered thereto and a further strip of adhesive tape adhered to the strip of silicone elastomer material, said strips of adhesive tape adhering the sheet to the base plate; and

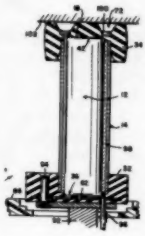
means for establishing a vacuum within the bag when adhered to the base plate.

4,698,116

BOLUS ASSEMBLY APPARATUS

Gregory S. Bassett, Indianapolis, and Robert L. Bollman, Mooresville, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 14, 1986, Ser. No. 839,636
Int. Cl.[4] B29C *33/10*; B32B *31/06*
U.S. Cl. 156—423 **9 Claims**



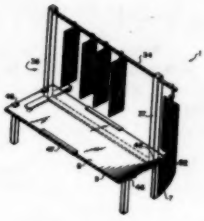
1. Assembly apparatus for adhesively bonding a first element having opposed end surfaces within a second element so as to leave the end surfaces exposed, the apparatus comprising: a lower seal and an upper seal, each seal composed of a soft, elastomeric polymer having an axially internal surface for contacting the end surface of the first element, positioning means defining an edge of the axially internal surface for positioning said end surface wholly within said edge, and a step radially spaced outside said edge for positioning the second element at a preselected distance from the first element, at least one of the upper and lower seals including means for introducing cementitious material between said edge and said step, and at least one of the seals including a reinforcing plate situated adjacent to said axially internal surface for reinforcing the seal.

4,698,117

INSTALLMENT SYSTEM FOR TABLE SKIRTING

Brent M. Enison, Tappan, N.Y., assignor to Prestige Skirting and Tablecloths Inc., Orangeburg, N.Y.

Filed Feb. 24, 1986, Ser. No. 831,830
Int. Cl.[4] A47F *7/16*; A47H *7/00*; B44C *7/00*; E05D *15/06*
U.S. Cl. 156—486 **5 Claims**



1. An apparatus to install table skirts to a perimeter of a table, wherein said table skirts have adhesive pile materials attached to an inner surface of the skirts, and comprising:

(a) a fastener attached to said perimeter of said table and having an adhesive pile material on an outer surface facing away from said perimeter of said table;

(b) a movable rack having a rod supported by vertical supports and an extension member telescoping into and out of said rod, a swivel hook being supported on said extension member;

(c) a hanger having a hook on one end and a plurality of strips of adhesive pile material affixed to at least one surface of said hanger; and

wherein said adhesive pile material attached to said inner surface of said skirts is removably attachable to said adhesive pile materials on said hanger so that said table skirts may be wound around said hanger so that said hanger would be supporting said table skirts in a storage position in which said hangers would be supported on said rod of said movable rack; and

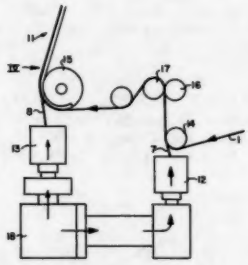
wherein said adhesive pile material on an inner surface of an end of said table skirts is removable from said adhesive pile material on said hanger and removably attachable to said adhesive pile material on said fastener attached to the perimeter of said table so that said table skirts can be unwound from said hanger when said hanger is in a work position suspended from said swivel hook on said extension member of said rod of said movable rack in order to wrap said table skirts around the perimeter of said table.

4,698,118

APPARATUS FOR FORMING PLASTIC FASTENER AND PLASTIC ACCESSORY STRIPS AND UNITING THE SAME WITH A FILM

Katsuhito Takahashi, Hamakita, Japan, assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed Jul. 20, 1984, Ser. No. 632,661
Int. Cl.[4] B29C *69/00;* **B29D** *5/10;* **B32B** *1/04*
U.S. Cl. 156—499 **7 Claims**



1. Apparatus for bonding a plastic fastener, having male and female interlockable profiles, and plastic accessory strip to a plastic film comprising:

a first forming die solely extruding therefrom said accessory strip;

a first bonding roll adjacent said first forming die for attaching said accessory strip onto said film at a first location thereon,

a second forming die solely extruding therefrom said fastener onto a surface of said film with the accessory strip already attached;

a second bonding roll adjacent said second forming die for attaching said fastener onto said film at a further location thereon apart from said first location, said second bonding roll attaching said fastener after said accessory strip has already been attached at said first bonding roll, and

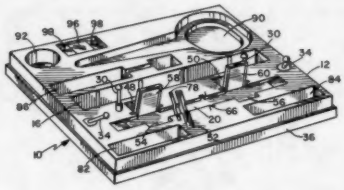
means conducting film and accessory strip against said first bonding roll and then conducting said film with accessory strip bonded thereto and said fastener against said second bonding roll such that the heat retained by said accessory strip from its extrusion does not interfere with the bonding of the fastener at a different bonding temperature.

4,698,119

APPARATUS FOR SPLICING MAGNETIC TAPE

Teddy G. Easterling, Box 1822, Rancho Santa Fe, Calif. 92067

Filed Sep. 10, 1982, Ser. No. 415,562
Int. Cl.[4] B31F *5/06;* **G03D** *15/04*
U.S. Cl. 156—506 **19 Claims**



1. An apparatus for splicing magnetic tape wound between a pair of reels in a cassette having a door along one side edge which swings open to expose a segment of the tape for engagement by magnetic head, comprising:

a base for horizontally supporting the cassette;

door retention means on the base for holding the cassette door open including an upwardly opening, elongate channel formed in the base;

track means on the base for aligning a length of the tape unwound from the cassette in a straight segment with the tape extending in a horizontal plane;

guide means on the base for feeding tape from one reel of the cassette to the track means and back to the other reel of the cassette;

clasp means mounted on the base for movement to a closed position to hold the tape in horizontal alignment in the track means and for movement to an open position to allow the tape to be moved in the track means; and

a groove extending across the track means for permitting a cuting implement to slice through the length of tape aligned in the track means.

4,698,120

BARRIER FOR QUARTZ CRUCIBLE FOR DRAWING SILICON DENDRITIC WEB AND METHOD OF USE

William C. Higginbotham, North Huntingdon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 666,066, Oct. 29, 1984, abandoned.
This application Jan. 28, 1986, Ser. No. 823,823
Int. Cl.[4] H01L *21/20, 21/208;* **B01D** *9/00*
U.S. Cl. 156—608 **10 Claims**

6. An improved method for continuously drawing dendritic silicon web from a dendritic web drawing section of an elongated quartz crucible means having a closed bottom portion, two end portions, and two side members, the end portions and the side members being sealingly attached to the bottom portion and extending upwardly therefrom, the bottom portion, end portions, and side members being heated by a heating means, the silicon drawn off as web from the web drawing section being continuously replaced by additions of unmelted silicon into a melt replenishment section means of the crucible means, the melt replenishment means being physically and thermally separated from the web drawing section by improved quartz barrier means having lateral edges, a top edge, and a bottom edge, the improved quartz barrier means having aperture means for passing silicon melted in the melt replenishment section means into the web drawing section to replace silicon drawn off as web, the aperture means comprising apertures disposed only along the lateral edges of the barrier means a first predetermined distance above the bottom edge of the barrier means and a second predetermined distance below the top edge of the barrier means, the bottom edge of the barrier means sealingly engaging the bottom portion of the crucible means and the lateral edges of the barrier means sealingly

engaging portions of the side members of the crucible means for prohibiting flow of molten silicon from the melt replenishment section means into the web drawing section except through the apertures, the improved method comprising:

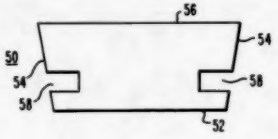
drawing silicon dendritic web from the web drawing section of the quartz crucible means at a predetermined rate resulting in removal of a predetermined quantity of silicon from the crucible means,

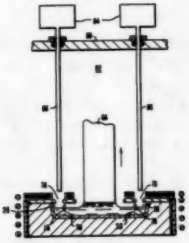
adding a predetermined amount of unmelted silicon to the silicon melt replenishment section means, the predetermined amount being substantially the same as the quantity removed by web drawing,

melting the unmelted silicon in the melt replenishment section means,

preventing silicon melted in the melt replenishment section means from flowing into the dendritic web drawing section except through the apertures disposed only along the lateral edges of the barrier means,

permitting flow of silicon from the melt replenishment section means into the web drawing section only through the apertures in the lateral edges of the barrier means, the positioning of the apertures adjacent the heated side portions of the quartz crucible means causing the silicon





melted in the melt replenishment section means to be heated before passing into the web drawing section by contact with the heated side members of the quartz crucible means, the positioning of the apertures a first predetermined distance above the bottom edge of the barrier means prohibiting silicon from passing into the web drawing section until a pool of molten silicon of a predetermined depth has formed in the melt replenishment section means, and the positioning of the apertures a second predetermined distance below to top edge of the barrier means causing the silicon to flow into the web drawing section at a third predetermined distance below the level of molten silicon in the melt replenishment section means so that unmelted silicon which is supported upon the molten silicon in the melt replenishment section means is prohibited from passing into the web drawing section by the barrier means, the positioning of the apertures only in the lateral edges of the barrier means a first predetermined distance above the bottom edge thereof and a second predetermined distance below the top edge thereof preventing thermal and physical disturbance of the web drawing section to enable continuous drawing of silicon dendritic web therefrom.

4,698,121

METHODS FOR THE PREPARATION OF ORIENTED THIN LARGE-AREA SINGLE CRYSTALS OF DIACETYLENES AND POLYDIACETYLENES

Mrinal K. Thakur, Waltham; Sukant K. Tripathy, Arlington, and Daniel J. Sandman, Acton, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Feb. 26, 1985, Ser. No. 705,586

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] C30G *1/12, 29/54, 29/58*

U.S. Cl. 156—622 **12 Claims**

1. A method for preparing thin large area single crystal of diacetylene monomer comprising:

forming a liquid layer of a molten pure diacetylene monomer represented by the formula

R—C≡C—C≡C—R′

wherein R and R′ are side groups selected such that the diacetylene monomer is polymerizable by a 1,4-addition solid state reaction upon exposure to actinic radiation between two clean, parallel, flat, smooth, opposed surfaces, one surface being movable with respect to the other surface;

applying pressure of at least 5 psi to the molten monomer layer disposed between the two opposed surfaces;

shearing the molten monomer layer by sliding the movable surface in a single direction across the molten monomer layer, while keeping the molten monomer layer under constant pressure of at least 5 psi; and

crystallizing the shorn molten monomer layer by cooling, while maintaining constant pressure on the shorn molten monomer layer, to form a thin large-area single crystal of diacetylene monomer of a single predetermined growth direction;

wherein the steps of forming, applying pressure to, shearing, and crystallizing the molten monomer layer are all carried out in an inert atmosphere.

4,698,122

METHOD OF DIFFUSION OF IMPURITIES

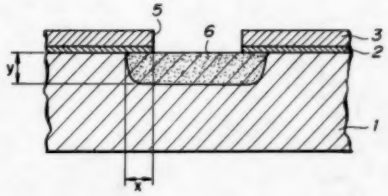
Masaru Wada, and Yoji Kato, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 27, 1985, Ser. No. 802,475

Claims priority, application Japan, Nov. 27, 1984, 59-248795

Int. Cl.[4] B44C *1/22;* **C03C** *25/06*

U.S. Cl. 156—625 **10 Claims**



1. A method of selectively diffusing an impurity into the surface of a compound semiconductor which comprises:

applying a diffusion mask directly onto the compound semiconductor substrate while limiting the oxygen-containing layer at the interface between said mask and said substrate to less than 20 Å, and

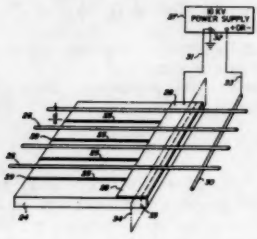
diffusing said impurity through said mask and into said substrate.

4,698,123

METHOD OF ASSEMBLY FOR OPTICAL FIBER DEVICES

Edward P. Link, Rochester, and John P. Kerwawycz, Henrietta, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 12, 1986, Ser. No. 929,687
Int. Cl.[4] C23F 1/02; B44C 1/22; C03C 15/00, 25/06
U.S. Cl. 156—634 5 Claims



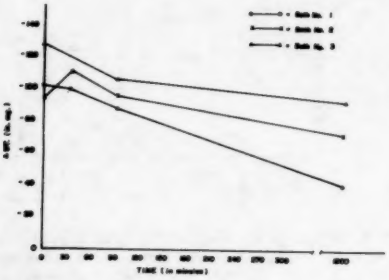
1. A method for producing an optical fiber sensing device comprising the steps of:
(a) forming a metal cladding on one surface of a dielectric substrate;
(b) photolithographically patterning and etching the metal cladding on the substrate to form a bus and a plurality of spaced, parallel conductive lines extending from the bus;
(c) placing a plurality of glass optical fibers on the substrate surface having the bus and lines, so that each fiber is within a predetermined distance of one of the lines;
(d) applying an electric potential between the fibers and the lines, the potential having sufficient magnitude to attract and hold the fibers to the lines;
(e) adhering the fibers to the substrate and their respective lines with an adhesive while the fibers are being electrostatically held by and in alignment with the lines; and
(f) removing the potential, after the adhesive has at least partially cured.

4,698,124

METHOD OF REGENERATING PERMANGANATE ETCH BATH

Gerald Krulik, Laguna Hills, Calif., assignor to Morton Thiokol, Inc., Chicago, Ill.

Continuation of Ser. No. 740,129, May 31, 1985, abandoned. This application Jun. 27, 1986, Ser. No. 879,762
Int. Cl.[4] B44C 1/22; B29C 37/00; C23F 1/00; C03C 15/00
U.S. Cl. 156—642 4 Claims



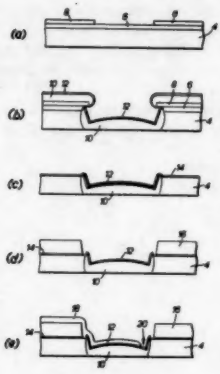
1. A method for regenerating the spent permanganate ions in an alkaline permanganate-containing etchant composition, said method comprising periodically adding to the composition, in an amount sufficient to oxidize essentially all of the non-permanganate manganese species in the composition to permanganate, an oxidizer selected from the group consisting of an inorganic peroxydisulfate, mixtures of an inorganic peroxydisulfate and an inorganic hypochlorite, and mixtures of an inorganic peroxydisulfate and an inorganic chlorate.

4,698,125

METHOD OF PRODUCING A LAYERED STRUCTURE

Stephen J. Rhodes, Northampton, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Jun. 15, 1984, Ser. No. 621,208
Claims priority, application United Kingdom, Jun. 16, 1983, 8316477
Int. Cl.[4] B44C 1/22; C23F 1/02
U.S. Cl. 156—643 15 Claims



1. A method for producing a layered structure having non-nested vias, the method comprising:
forming a spacer layer on a substrate,
forming a parting layer on the spacer layer,
forming a first masking pattern on the parting layer, the first masking pattern delineating field regions in a first metal layer,
etching the spacer layer and the parting layer ion accordance with the first masking pattern to form openings in the spacer layer,
depositing a first sputtered metal layer over the etched spacer layer and the openings formed therein,
depositing an etch barrier layer on the first sputtered metal layer,
dissolving the parting layer to remove the first masking pattern and the first sputtered metal layer and the etch barrier layer in the field regions to produce a structure having a first metallization pattern of the first metal layer and the etch barrier layer, the depositing of the first sputtered metal layer and the dissolving of the parting layer serving to provide the structure with a substantially planer surface for facilitating deposition of subsequent layers,
depositing a passivation layer on the spacer layer and the first metallization pattern,
depositing a dielectric layer on the passivation layer,
forming a second masking pattern on the dielectric layer,
exposing the etch barrier layer of the first metallization pattern in accordance with the second masking pattern, the passivation layer protecting the spacer layer in the field regions,
depositing a second sputtered metal layer on the dielectric layer, the second sputtered metal layer extending in contact with the etch barrier layer of the first metallization pattern which was exposed by etching in accordance with the second masking pattern,

forming a third masking pattern on the second sputtered metal layer, and

etching the second sputtered metal layer in accordance with the third masking pattern to produce a second metallization pattern on the dielectric layer having a non-nested via extending into contact with the first metallization pattern.

4,698,126

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE BY PLASMA ETCHING OF A DOUBLE LAYER

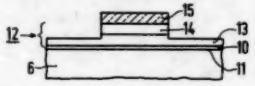
Alfred J. Van Roosmalen, and Anton P. M. Van Arendonk, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,488

Claims priority, application Netherlands, Mar. 18, 1985, 8500771

Int. Cl.[4] H01L *21/306*

U.S. Cl. 156—643 **5 Claims**



1. A method of manufacturing a semiconductor device comprising the steps of

coating a surface of a semiconductor substrate with a layer of silicon oxide,

applying a double layer to said layer of silicon oxide, said double layer being a first layer of polycrystalline-silicon contacting said layer of silicon oxide and a second layer of a silicide on top of said first layer,

forming an etching mask on said double layer, said etching mask having openings to said double layer,

etching said double layer through said openings with an etching plasma of chlorine gas,

adding up to 20% by volume of tetrachloromethane to said chlorine gas said adding being sufficient to provide anisotropic etching of both the silicide and the polycrystalline-silicon, and

stopping supply of said tetrachloromethane to said chlorine gas after said polycrystalline-silicon has been partly etched and before said layer of silicon oxide is etched.

4,698,127

PROCESS FOR FABRICATING A SELF-ALIGNED BIPOLAR TRANSISTOR

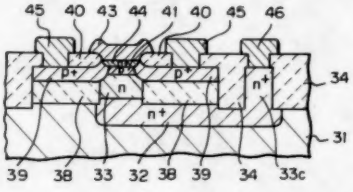
Osamu Hideshima, Kawasaki, and Hiroshi Goto, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 10, 1986, Ser. No. 850,054

Claims priority, application Japan, Apr. 10, 1985, 60-76055; Jun. 26, 1985, 60-137694; Aug. 20, 1985, 60-182262

Int. Cl.[4] H01L *21/04, 21/22, 21/306;* B44C *1/22*

U.S. Cl. 156—643 **17 Claims**



1. A process for fabricating a bipolar transistor, comprising the steps of:

preparing a semiconductor substrate;

defining a first doped region of a first conductivity type adjacent to the surface of the semiconductor substrate;

forming a mask layer on the first doped region, the mask layer having a pattern corresponding to that of an active area of the transistor to be formed;

locally implanting ions into the first doped region, using the mask layer as a mask, to form a buried insulating layer;

locally introducing dopants in the first doped region at the surface of the substrate and above the buried insulating layer, using the mask layer as a mask, to form a base contact region of a second conductivity type opposite to the first conductivity type;

forming an intrinsic base region of the second conductivity type in the first doped region adjacent to the base contact region;

forming an emitter region of the first conductivity type in the intrinsic base region and adjacent to the surface of the substrate; and

using the first doped region of the first conductivity type below the intrinsic base region as a collector.

4,698,128

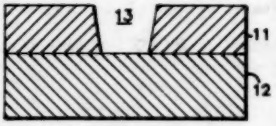
SLOPED CONTACT ETCH PROCESS

Robert K. Berglund, Mesa; Karl E. Mautz, Chandler, and Roger Tyldesley, Mesa, all of Ariz., assignors to Motorola, Inc., Schamburg, Ill.

Filed Nov. 17, 1986, Ser. No. 931,304

Int. Cl.[4] B44C *1/22;* C03C *15/00, 25/06*

U.S. Cl. 156—643 **22 Claims**



1. A process is claimed for providing a sloped contact etch comprising the steps of:

(a) etching a substrate a first time in an area defined by a resist layer;

(b) removing a polymer produced on said substrate during said step of etching said substrate a first time;

(c) etching said resist layer thereby increasing the area of said substrate defined by said resist layer; and

(d) etching said substrate in the area defined by said resist layer.

4,698,129

FOCUSED ION BEAM MICROMACHINING OF OPTICAL SURFACES IN MATERIALS

Joseph Puretz, Beaverton; Jonathan H. Orloff, Portland; Richard K. DeFreez, Hillsboro, and Richard A. Elliott, Beaverton, all of Oreg., assignors to Oregon Graduate Center, Beaverton, Oreg.

Filed May 1, 1986, Ser. No. 858,357

Int. Cl.[4] H01L *21/306;* B44C *1/22;* C03C *15/00, 25/06*

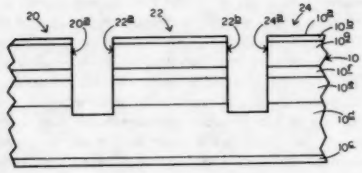
U.S. Cl. 156—643 **4 Claims**

1. A method of preparing, in a body of material, an optical surface to form part of an optical device, said method comprising

exposing a selected face in such a body in a predetermined work zone,

directing a focused ion beam in a selected manner into such work zone to impinge the selected face in the body, and

by said directing and impinging, removing material from the body thus to create the desired optical surface, which



surface intersects the selected face in the body in a desired manner.

4,698,130

CLEANING OF METAL ARTICLES

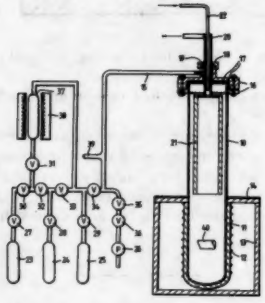
James E. Restall, Camberley, and Cecil Hayman, Rickmansworth, both of England, assignors to The Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Aug. 29, 1986, Ser. No. 885,442

Claims priority, application United Kingdom, Jul. 2, 1986, 8517766

Int. Cl.[4] **B44C** *1/22*; **C23F** *1/00*; **C05C** *15/00, 25/06*

U.S. Cl. 156—646 **27 Claims**



1. A cleaning process for removal of surface oxide and corrosion contamination from metallic articles especially those articles which contain passages or cracks, which comprises putting at least one metallic article within a reaction vessel, establishing within that reaction vessel a reactive atmosphere containing at least one halide component, raising the temperature of the article and of the reactive atmosphere within the reaction vessel to a degree such that the or each halide component has sufficient activity to react with surface oxide and corrosion contamination on the article and controlling that temperature to maintain the reaction whilst avoiding heat damage to the article, and cyclically varying the pressure of the reactive atmosphere within the reaction chamber so as to cause general movement of the reactive atmosphere in the region of the article and flow of the gaseous reactants into and out of any passages or cracks in the article.

4,698,131

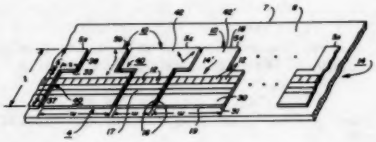
REPLACEABLE IMAGE SENSOR ARRAY

Mehdi N. Araghi, Webster, and Jagdish C. Tandon, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 13, 1985, Ser. No. 808,799

Int. Cl.[4] **H01L** *21/306*; **B44C** *1/22*

U.S. Cl. 156—647 **4 Claims**



1. A method of fabricating a sensor array on a chip for assembly with other like arrays in abutting end to end relationship to form a longer composite array and which is capable of being removed and replaced without damaging the other arrays or causing loss of image quality, comprising the steps of:

(a) forming at least one row of photosites on a relatively large (110) silicon wafer;

(b) orientating dependent etching edge separation lines along the (111) plane of said wafer to delineate the top and bottom edges of said chip;

(c) orientating dependent etching end separation lines along the (111) plane of said wafer to delineate chip ends having a generally L-shaped offset therein by etching a first separation line between two adjacent photosites in said photosite row extending from one edge of said chip toward the chip interior, a second separation line longitudinally offset from the first separation line and extending from a point spaced opposite the terminus of said first separation line to the other edge of said chip, and a third separation line connecting the termini of the first and second separation lines, said first, second and third lines cooperating to form end separation lines with said generally L-shaped offset; and

(d) separating said chip from said wafer along said separation lines to provide a generally rectangular shaped chip, each end of said chip having a generally L-shaped offset for interlocking abutment and alignment with complementary offset ends of other like arrays.

4,698,132

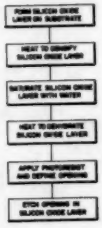
METHOD OF FORMING TAPERED CONTACT OPENINGS

Timothy A. Dennis, Bloomdale, Ohio, assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 30, 1986, Ser. No. 913,325

Int. Cl.[4] **H01L** *21/312*

U.S. Cl. 156—657 **10 Claims**



1. In a method of etching tapered openings in a layer of silicon oxide or a substrate wherein a layer of a resist is coated on the silicon oxide layer, the resist layer is provided with an

opening therethrough to expose a portion of the silicon oxide layer and the silicon oxide layer is etched such that the edge of the resist layer is lifted from the silicon oxide layer to cause a tapered opening to be etched through the silicon oxide layer, the improvement comprising the step of

prior to coating the silicon oxide layer with the resist, substantially saturating the silicon oxide layer with water, and then heating the silicon oxide layer to dehydrate the silicon oxide layer a desired amount such that all of the silicon oxide layer is dehydrated to substantially the same moisture level.

4,698,133

DETACKIFICATION OF ADHESIVE MATERIALS CONTAINED IN SECONDARY FIBER

Robert D. Moreland, Jacksonville, Fla., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Apr. 28, 1986, Ser. No. 856,733
Int. Cl.[4] D21C *5/02*
U.S. Cl. 162—5 **10 Claims**

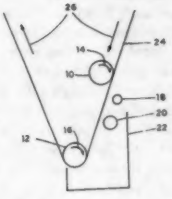
1. A method of inhibiting the deposition and adherency of hot melt and/or pressure sensitive adhesive materials on the surfaces of repulping equipment during the repulping of waste paper and waste paper products containing such which comprises adding a water-soluble polymer to said waste paper or waste paper products and repulping said waste paper or waste paper products in the presence of a sufficient amount for the purpose of said water-soluble polymer which is effective for the purpose comprised of nonionic water-soluble unsubstituted methyl ether cellulose derivatives.

4,698,134

METHOD FOR CLEANING PAPERMAKING FABRICS

Marshall S. Green, deceased, late of Waterbury Centre, Vt. (by Elisabeth Green, administrator), and Jean-Paul Boisvert, Grand'Mere, Canada, assignors to Consolidated-Bathurst, Inc., Montreal, Canada

Continuation of Ser. No. 555,066, Nov. 25, 1983, abandoned.
This application Oct. 21, 1985, Ser. No. 789,432
Int. Cl.[4] O21F *1/32*
U.S. Cl. 162—199 **8 Claims**



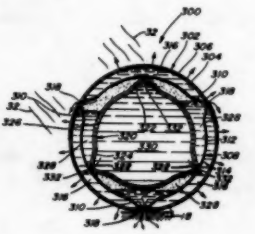
1. A method of removing a fluid from a fluid containing permeable fabric having opposed major surfaces, one of the major surfaces having been in contact with a paper web for dewatering of the web, the method comprising the steps of supporting said fabric, directing a jet of gaseous material at said one major surface having been in contact with the paper web, and controlling the velocity of said gaseous material in response toat least the porosity of the fabric and loading of the fabric and distance between the source of jet of gaseous material with respect to the fabric, such that a major portion of said gaseous material does not pass through the permeable fabric and said jet of gaseous material creates an area of low pressure adjacent to and on the same fabric surface at which said gaseous material is directed, thereby causing the removal of a portion of the fluid within the fabric from the same side of said fabric at which said gaseous material is directed.

4,698,135

DESALINATING DRIP-IRRIGATION SYSTEM

Simon Raab, Lorraine, Canada, assignor to Sirdan Research Limited, Lorraine, Canada

Continuation of Ser. No. 465,654, Feb. 10, 1983, abandoned.
This application Oct. 3, 1985, Ser. No. 783,332
Int. Cl.[4] C02F *1/14*
U.S. Cl. 202—234 **8 Claims**



1. A desalinating drip-irrigation system for use adjacent a plant supporting material to be irrigated, for converting salt water into fresh water and dispensing said fresh water dripwise to said plant supporting material, said system comprising:

an evaporator member consisting of a microporous hydrophobic material and having first and second surfaces, said microporous hydrophobic material permitting water vapor to diffuse through said member between said first and second surfaces thereof while preventing liquid water from passing therethrough;

a condenser member having a condensing surface spaced from said second surface of said evaporator member to define a gap therebetween, said condensing surface being in liquid flow communication with said plant supporting material to be irrigated;

means for conducting a flow of salt water along said first surface of said evaporator member; and

means for generating a temperature gradient between said first surface of said evaporator member and said condensing surface, said temperature gradient generating means including an evaporator cooling member forming with said condenser member a cooling chamber for containing a cooling liquid, said evaporator cooling member consisting of said microporous hydrophobic material and causing evaporative cooling of said liquid on exposure of said evaporator cooling member to dry ambient air, thereby cooling said condensing surface and generating a temperature gradient which causes evaporation of said salt water at said first surface and diffusion of the resulting water vapor through said evaporator member from said first surface to said second surface thereof and across said gap so as to condense on said condensing surface and to thereby form condensed fresh water which is allowed to drip off said condensing surface to be absorbed by said plant supporting material.

4,698,136

PROCESS FOR THE CONTINUOUS PRODUCTION OF BOILER FEED WATER

Mohammed El-Allawy, Bremen, Fed. Rep. of Germany, assignor to Fried Krupp GmbH, Essen, Fed. Rep. of Germany

Filed May 23, 1985, Ser. No. 737,014
Claims priority, application Fed. Rep. of Germany, May 23, 1984, 3419171
Int. Cl.[4] B01D *3/10, 19/00*
U.S. Cl. 203—11 **13 Claims**

1. Process for the continuous production of pure water for boiler feed from waste waters containing salt, hydrocarbon and Fe^{++}, comprising:

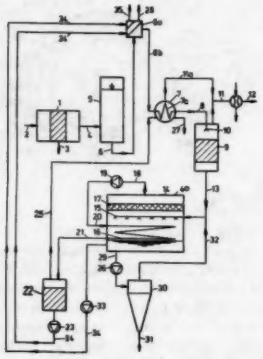
mechanically purifying the waters,

subjecting the mechanically purified waters to a thermal degassing in a degasser under vacuum in the absence of air,

subjecting the resulting thermally degassed waters to spray film evaporation in a spray film tube evaporator by spraying the waters onto the outside surfaces of a heat exchanger to produce vapor,

subjecting the resulting produced vapor to a mechanical vapor compression,

passing the resulting compressed vapor inside the heating



surfaces of the spray film evaporator to condense the vapor inside the heating surfaces, while maintaining the temperature on the outside of the heating surfaces at a lower temperature than the temperature inside the heating surfaces,

feeding the condensed water from inside the heating surfaces of the evaporator in the presence of a water vapor- and non-condensable hydrocarbons,

removing the condensed water from the separator, and

drawing off the non-condensable hydrocarbons from the top of the separator.

4,698,137

SEPARATION OF ISOPROPYL ACETATE FROM ISOPROPANOL BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715

Continuation-in-part of Ser. No. 768,330, Aug. 22, 1985. This application Mar. 5, 1986, Ser. No. 836,489

The portion of the term of this patent subsequent to Mar. 26, 2002, has been disclaimed.

Int. Cl.[4] B01D *3/40*; C07C *67/48*

U.S. Cl. 203—51 **7 Claims**

1. A method for recovering isopropyl acetate from a mixture of isopropyl acetate, isopropanol and water which comprises distilling a mixture of isopropyl acetate, isopropanol and water in a rectification column in the presence of about one to two parts of an extractive agent per part of isopropyl acetate - isopropanol - water mixture, recovering isopropyl acetate and water as overhead product and obtaining the extractive agent and isopropanol from the stillpot, the extractive agent comprises an acid amide containing from two to four carbon atoms.

4,698,138

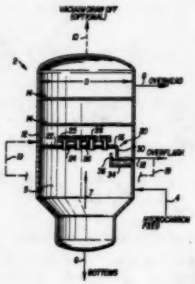
DE-ENTRAINMENT CHIMNEY AND METHOD OF OPERATION

Frank C. Silvey, Plainsboro, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 738,716, May 29, 1985, abandoned. This application Jun. 6, 1986, Ser. No. 871,632

Int. Cl.[4] B01D *3/10*

U.S. Cl. 203—91 **23 Claims**



1. In combination with a flash zone a de-entrainment chimney apparatus for a tower plate having a hole therethrough comprising:

a riser positioned downstream of said flash zone for passing a stream comprising vapor and liquid upwardly through said hole, wherein a portion of said riser extends upwardly from said plate and is attached to said plate at the perimeter of said hole, said riser having a first opening below said plate and a second opening located a distance above said plate, said plate adapted to have a layer of liquid on its upper surface;

a hat for downwardly directing said stream from said riser second opening, and comprising a top wall attached to sidewalls, said hat being located a distance above said layer and located apart from said riser and a top portion of said riser being located within said hat to form an annulus in open communication with the atmosphere of said tower, said annulus forming a means for passing said stream downwardly from said hat, the cross-sectional area of said annulus being substantially constant and less than the cross-sectional area of said riser at said second opening to increase the speed of said stream through said annulus relative to its speed through said second opening of said riser, said sidewalls of said hat spaced above said plate so as to allow said vapor portion of said downward stream from said annulus to turn upwardly, thereby de-entraining a major portion of said liquid from said stream.

12. A method of de-entraining liquid from a stream comprising liquid and vapor in a tower downstream of a flash zone, comprising the steps of:

upwardly passing said stream through a hole of a plate in said tower;

passing said stream through a riser positioned downstream of said flash zone, wherein a portion of said riser extends upwardly from said plate and is attached to said plate at the perimeter of said hole, said stream enters through a first opening of said riser below said plate and exits upwardly through a second opening of said riser located a distance above said plate, said plate having a layer of liquid on its upper surface;

contacting said upward stream with a hat to direct said stream downwardly, wherein said hat comprises a top wall attached to sidewalls, said hat being spaced a distance above said layer of liquid and located apart from said riser and a top portion of said riser being located within said hat to form an annulus having a cross-sectional area which is

substantially constant and less than the cross-sectional area of said riser at said second opening;

passing said downward stream through said annulus at a higher velocity than it passes through said second opening of said riser;

passing said downward stream from said annulus directly into the atmosphere of said tower; and

directing said vapor portion of said downward stream from said annulus upwardly to de-entrain the liquid portion from said stream.

4,698,139

HYDROMETALLURGICAL METHOD FOR TREATING VALUABLE METAL RAW MATERIALS CONTAINING CHLORIDES AND FLUORIDES

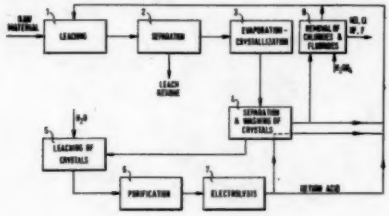
Sigmund P. Fugleberg, Pori, and Jaakko I. Poijärvi, Vanha-Ulvila, both of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Continuation of Ser. No. 660,518, Oct. 12, 1984. This application Jan. 6, 1986, Ser. No. 816,951

Claims priority, application Finland, Oct. 21, 1983, 833869

Int. Cl.[4] C25C *1/16*; C22B *3/00*

U.S. Cl. 204—112 **1 Claim**



1. A hydrometallurgical method for treating valuable metal raw materials containing chlorides and fluorides in order to recover valuable metals selected from the group consisting of Zn, Ni, Co, Cu, Mn, Mg and Fe, free from chloride and fluorides, for electrolytical removal, comprising leaching the valuable metal raw material containing chlorides and fluorides into a sulphuric acid solution, the major portion of which consists of the return acid obtained from the electrolysis, and selectively crystallizing only the valuable metal sulphate from the solution; washing the created sulphate crystals in the electrolysis return acid, and thereafter leaching the dechlorinated and defluorinated valuable metal sulphate crystals into water, and purifying the resulting solution and recovering the valuable metals though electrolysis;

said chlorides and fluorides being removed in a bleed from the mother liquor of the valuable metal crystallization, and

wherein sulphuric acid solution is fed into the bleed from the mother liquor crystallization stage to increase the sulfuric acid content thereof, and wherein chlorides and fluorides are removed from the bleed from the mother liquor of the crystallization by means of evaporating them in said increased sulphuric acid content and at an increased temperature.

4,698,140

TECHNIQUES FOR PREPARING MAGNETIC PARTICLES HAVING UTILITY IN RECORDING MEDIA

Jacob Crane, Woodbridge; George J. Muench, West Haven; Yousef Saleh, Branford, and Lifun Lin, Hamden, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 803,379, Dec. 2, 1985, Pat. No. 4,657,583, which is a continuation-in-part of Ser. No. 773,484, Sep. 9, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 947,059

Int. Cl.[4] C25F *5/00*

U.S. Cl. 204—146 **14 Claims**

1. A process for forming passivated free magnetic particles, said process comprising:

forming a plurality of magnetic particles,

providing an electrolytic cell containing two electrodes and an aqueous pyrophosphate solution electrolyte;

immersing said particles in said electrolyte, and

applying a current having a current density in the range of from about 10 mA/cm^2 to about 30 mA/cm^2 to form said passivated particles.

4,698,141

CATIONIC, ADVANCED EPOXY RESIN COMPOSITIONS

Kenneth W. Anderson, and Richard A. Hickner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 18, 1986, Ser. No. 887,849

Int. Cl.[4] C25D *13/00*; C08L *63/00*

U.S. Cl. 204—181.7 **30 Claims**

1. In a process for preparation of an advanced epoxy cationic resin from an epoxy resin composition having terminal oxirane groups which includes the step of converting oxirane groups to cationic groups by reacting a nucleophile with at least some of the oxirane groups of the epoxy resin composition wherein an organic acid and water are added during some part of this conversion, the improvement of using as the epoxy resin composition an advanced epoxy resin obtained by reacting in the presence of a suitable catalyst

(A) a composition comprising (1) at least one diglycidylether of a polyetherpolyol, and (2) a diglycidylether of a dihydric phenol, with

(B) at least one dihydric phenol

wherein (A-1) and (A-2) are employed in such quantities that about 10 to about 75 weight percent of the glycidyl ethers contained in component (A) are contributed by (A-1) and from about 25 weight percent to about 90 weight percent of the glycidyl ethers are contributed by (A-2), and components (A) and (B) are employed in such quantities that the resultant epoxide equivalent weight is from about 350 to about 10,000; whereby there is obtained a cationic, advanced epoxy resin having a charge density of from about 0.2 to about 0.6 milliequivalent of charge per gram of resin.

15. In a process of coating a cationic, epoxy resin-based composition onto an object having an electroconductive surface by steps comprising immersing the electroconductive object into a coating bath comprising an aqueous dispersion of cationic particles of the epoxy-based composition, passing an electric current through said bath sufficient to electrodeposit a coating of said composition on the object by providing a difference of electrical potential between the object and an electrode that is (a) spaced apart from said object (b) in electrical contact with said bath and (c) electrically positive in relation to said object, the improvement which comprises using as the cationic resin composition a composition comprising a cationic, advanced epoxy-based resin having a charge density of from about 0.2 to about 0.6 milliequivalent of cationic charge per gram of resin obtained by reacting in the presence of a suitable catalyst

(A) a composition comprising (1) at least one diglycidylether of a polyetherpolyol, and (2) a diglycidylether of a dihydric phenol, with

(B) at least one dihydric phenol

wherein (A-1) and (A-2) are employed in such quantities that about 10 to about 75 percent of the diglycidylethers contained in component (A) are contributed by (A-1) and from about 25 percent to about 90 percent of the diglycidylethers are contributed by (A-2), and components (A) and (B) are employed in such quantities that the resultant epoxide equivalent weight is from about 350 to about 10,000; whereby, there is formed an advanced epoxy resin having terminal oxirane groups and converting at least some of the oxirane groups to cationic groups.

4,698,142

FREE-FLOW ELECTROPHORETIC SEPARATION METHOD AND APPARATUS THEREFOR

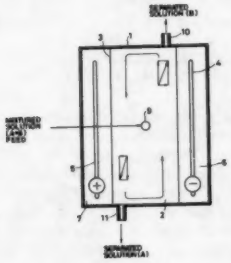
Katsumi Muroi; Kosai Hiratsuka; Shoji Yoshinaga, all of Kudamatsu; Toji Nakatsui, Hikari; Chikao Oda, and Kiyoshi Fujiwara, both of Kudamatsu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

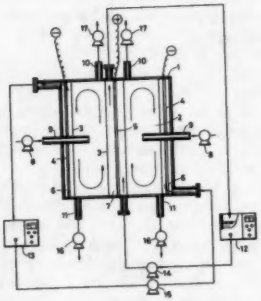
Filed Jul. 31, 1985, Ser. No. 760,940

Claims priority, application Japan, Jul. 31, 1984, 59-158724; Sep. 26, 1984, 59-199582

Int. Cl.[4] **G01N** *27/28, 27/26*

U.S. Cl. 204—182.3 **2 Claims**





1. A free-flow electrophoretic separation method, which comprises:

a step of supplying a solution containing charged substances to be separated into an electrophoresis cell at the center thereof, said cell having electrode cells at the both sides thereto and being partitioned from each of said electrode cells at said both sides with a membrane;

a step of causing said solution to flow as one main stream in a one direction at the center of said cell, causing said stream to divide into two partial streams and then for each partial stream to flow toward to one of said membranes, causing the partial stream to then flow along a membrane in a direction opposite to said direction at said center, and causing said partial streams having flowed along each of said membranes to then flow toward to said center, thereby forming two closed cycles of circulating flow;

a step of applying a d.c. voltage to positive and negative electrodes located, respectively, in said electrode cells to generate an electric field and to impose said electric field on said flowing solution thereby promoting said circulating flows and causing migration of the charged substances to at least one of said membranes; and

a step of withdrawing said charged substances from said electrophoresis cell and from each of the circulating flows at an end of the flow along a membrane in the direction opposite to the one direction at said center.

4,698,143

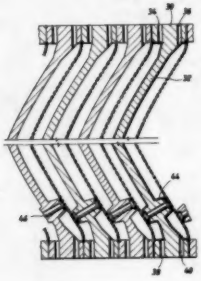
STRUCTURAL FRAME FOR AN ELECTROCHEMICAL CELL

Gregory J. E. Morris, Lake Jackson, and H. Gene Newton, Baytown, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 25, 1986, Ser. No. 878,457

Int. Cl.[4] **C25B** *9/00, 11/02, 11/10, 13/00*

U.S. Cl. 204—253 **42 Claims**



1. A circular structural frame with spherical anolyte and catholyte surfaces adapted for use between electrochemical cells comprising:

(a) a cell barrier member having two opposite surfaces wherein the surfaces are generally spherical anolyte and catholyte surfaces for adjacent electrochemical cells having anodes and cathodes therein:

(b) at least one electrically conductive insert extending from the catholyte surface of said barrier member through the barrier member, and to the anolyte surface of the barrier member, wherein said barrier member supports said insert;

(c) an electrically conductive, substantially completely hydraulically impermeable anolyte cover resistant to the corrosive effects of the anolyte matingly contacted with the anolyte surface of said barrier member and adapted to minimize contact between the anolyte and said barrier member within a first cell; and

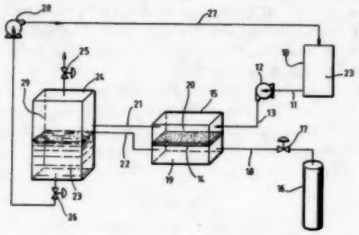
(d) an electrically conductive, substantially completely hydraulically impermeable catholyte cover resistant to the corrosive effects of the catholyte matingly contacted with the catholyte surface of said barrier member and adapted to minimize contact between the catholyte and said barrier member within a second cell.

4,698,144

APPARATUS FOR BALANCING ELECTROLYTIC CELL GAS WITH CIRCULATING ELECTROLYTE

Thomas J. Wainerdi, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 15, 1986, Ser. No. 863,278
Int. Cl.[4] C25B 9/00, 11/03, 11/12, 15/08
U.S. Cl. 204—257 26 Claims



1. Apparatus to equalize the pressure between a circulating liquid and a gas, within the pores of a porous gas electrode in an electrolytic cell, comprising:

a cell housing, separately connectable to a source of gas and a supply of liquid;

a porous gas electrode positioned within said cell housing so as to section said housing into a first compartment for said gas and a second compartment for said liquid;

a separate conduit connection connecting said source of gas to said first, gas compartment of said cell housing;

a separate conduit connection connecting said supply of liquid to said second, liquid compartment of said cell housing;

a holding tank for receiving excess gas and used liquid from said cell, said tank having separate conduit connections to said liquid compartment and said gas compartment; and

a pump positioned in said conduit connection between said supply of liquid and said liquid compartment to circulate said liquid therebetween.

4,698,145

SUPPORTED TRANSITION METAL SULFIDE PROMOTED MOLYBDENUM OR TUNGSTEN SULFIDE CATALYSTS AND THEIR USES FOR HYDROPROCESSING

Teh C. Ho, Bridgewater; Russell R. Chianelli, Somerville; Allan J. Jacobson, Princeton, and Archie R. Young, Montclair, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 28, 1984, Ser. No. 687,533
Int. Cl.[4] C10G 45/06, 47/06
U.S. Cl. 208—18 29 Claims

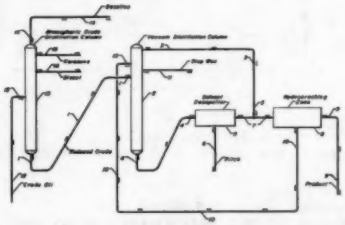
9. A process for hydrotreating a hydrocarbon feed which comprises contacting said feed at a temperature of at least about 150° C. and in the presence of hydrogen with a catalyst obtained by compositing a quantity of inorganic refractory oxide support material with one or more precursor salts and heating said composite at elevated temperature of at least about 150° C., in the presence of sulfur and under oxygen-free conditions for a time sufficient to form said catalyst, wherein said precursor salt contains a tetrathiometallate anion of Mo, W or mixture thereof and a cation comprising one or more divalent promoter metals which are chelated by at least one neutral, nitrogen-containing polydentate ligand L, wherein said divalent promoter metal is selected from the group consisting of Ni, Co, Zn, Cu and mixture thereof, said contacting occurring for a time sufficient to hydrotreat at least a portion of said feed.

4,698,146

HYDROCRACKING AND RECOVERING POLYNUCLEAR AROMATIC COMPOUNDS IN SLOP WAX STREAM

Adrian J. Gruia, Lake Bluff, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 23, 1986, Ser. No. 821,721
Int. Cl.[4] C10G 67/02, 67/04
U.S. Cl. 208—86 16 Claims



1. A catalytic hydrocracking process which comprises:

(a) introducing a reduced crude into a fractionation zone to produce a vacuum gas oil stream having a propensity to form polynuclear aromatic compounds in a hydrocracking zone and a slop wax stream;

(b) contacting said vacuum gas oil stream in a hydrocracking zone with added hydrogen and a metal promoted hydrocracking catalyst at elevated temperature and pressure sufficient to gain a substantial conversion to lower boiling products;

(c) partially condensing the hydrocarbon effluent from said hydrocracking zone and separating the same into a low boiling hydrocarbon product stream and an unconverted hydrocarbon stream boiling above about 650° F. (343° C.) and containing trace quantities of polynuclear aromatic compounds; and

(d) introducing at least a portion of said unconverted hydrocarbon stream containing polynuclear aromatic compounds into said fractionation zone thereby recovering a substantial portion of said polynuclear aromatic compounds in said slop wax stream which significantly minimizes the introduction of said polynuclear aromatic compounds into said hydrocracking zone.

4,698,147

SHORT RESIDENCE TIME HYDROGEN DONOR DILUENT CRACKING PROCESS

James R. McConaghy, Jr., Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Continuation of Ser. No. 729,763, May 2, 1985, abandoned. This application Jan. 28, 1987, Ser. No. 9,652
Int. Cl.[4] C10G 47/00
U.S. Cl. 208—107 3 Claims

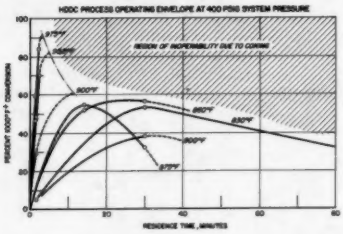
1. A hydrogen donor diluent cracking process consisting of the steps of:

(a) admixing partially hydrogenated hydrogen donor diluent and a heavy hydrocarbon oil feedstock;

(b) cracking said admixture in a furnace coil at a temperature of at least 900° F. and a pressure of not more than 1,000 psig, said cracking step extending for a residence time period in said furnace coil of not more than three minutes and until at least sixty volume percent of the feedstock material boiling above 1,000° F. is cracked to material boiling below 1,000° F.;

(c) separating the cracked material from step (b) into spent donor diluent and products;

(d) regenerating said spent donor diluent by partial hydrogenation;



(e) recovering said products; and

(f) returning said regenerated donor to said cracking step.

4,698,148

REMOVAL OF CHLORINE-BASED CONTAMINANTS FROM MATERIALS CONTAMINATED THE SAME

James Keane, 23 S. Harlan St., York, Pa. 17402

Division of Ser. No. 765,111, Aug. 13, 1985, Pat. No. 4,610,729, which is a continuation-in-part of Ser. No. 661,719, Oct. 17, 1984, which is a continuation of Ser. No. 274,433, Jun. 17, 1987, abandoned. This application Jun. 19, 1986, Ser. No. 875,928

Int. Cl.[4] C10G *1/04*

U.S. Cl. 208—390 **3 Claims**

1. A method of separating oil or bitumen from surfaces of a substrate covered with same, which comprises the steps of:

(a) dissolving the oil or bitumen in a first solvent to form a solution thereof;

(b) separating said solution from said substrate to provide a solution wet substrate;

(c) adding to the solution wet substrate a further solution consisting of a membrane-like material forming component derived from mineral crude oil, bitumen or amphipathic lipids in a second solvent selected from the group consisting of halogenated hydrocarbons and p-xylene, said second solvent being miscible with said first solvent and capable of forming in the presence of water and said membrane-like material forming component an interfacial membrane-like material which has a water side and is impermeable to the oil or bitumen; and

(d) intimately contacting water with the surface of said substrate so as to cause said membranelike material to form at the surface of the substrate with said water side oriented toward said surface while the water wets said surface and spreads thereover, whereby the membrane-like material incorporates during its formation the oil or bitumen and mixture of solvents adjacent said surface and the water displaces said membrane-like material away from said surface as it is being formed thereacross to thereby separate said oil or bitumen and mixture of solvents from said surface and cover said surface with a layer of water, said membrane-like material acting as a barrier to maintain said oil or bitumen in solution with said mixture of solvents and to prevent passage of same into said water layer.

4,698,149

ENHANCED RECOVERY OF HYDROCARBONACEOUS FLUIDS OIL SHALE

Thomas O. Mitchell, Trenton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 7, 1983, Ser. No. 549,120

Int. Cl.[4] C10G *1/00*

U.S. Cl. 208—428 **21 Claims**

1. In a hydrogen transfer extraction process for recovering hydrocarbonaceous fluids from oil shale containing kerogen where a mixture of said oil shale and a normally liquid hydrocarbon is reacted under substantially autogeneous pressure and a temperature under the retorting temperature of said oil shale for a period of time sufficient to recover hydrocarbonaceous fluids from said shale wherein the amount of liquid hydrocarbon in the mixture does not exceed 25 percent by weight of the shale, the improvement comprising:

(a) cooling the reactants and recovering by distillation said hydrocarbonaceous fluids from said shale;

(b) extracting the reacted shale with a solvent selected from a member of the group consisting of heptane, pyridine, tetrahydrofuran and mixtures thereof, which extract contains substantially increased amounts of hydrocarbonaceous fluids, which fluids contain substantially reduced amounts of hydrocarbonaceous gases and substantially increased amounts of hydrocarbonaceous liquids; and

(c) stripping said solvent from said extract and recovering said extract.

4,698,150

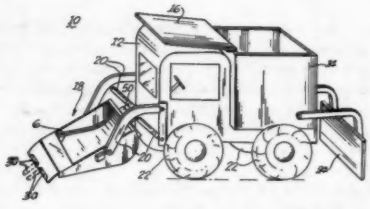
BEACH TRASH MACHINE

Luis Wigoda, 841 Washington Ave., Miami Beach, Fla. 33139

Filed Sep. 20, 1985, Ser. No. 778,395

Int. Cl.[4] B07B *1/00, 1/28;* E02F *3/00, 3/76*

U.S. Cl. 209—421 **13 Claims**



1. A machine for removing trash from a sandy beach comprising:

motorized means for moving along the beach and including a container;

shovel means attached to said motorized means for picking up trash and sand from said beach, said shovel means including attached screen means for separating said sand from said trash and returning said sand to the beach, said screen means being attached to said shovel means by means for permitting independent movement of said screen means with respect to said shovel means;

means for moving said screen means substantially independent of the movement of said shovel means for separating said sand and trash, said means for moving said screen means being mounted directly to and solely supported by said screen means; and

means for transferring said trash remaining in said shovel means to said container.

4,698,151

DYESTUFF REFINING SYSTEM

Kunitaka Ozawa, Tokyo; Masahiro Haruta, Funabashi; Tsuyoshi Eida, and Takashi Hamamoto, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 603,756, Apr. 25, 1984, abandoned. This application Nov. 6, 1985, Ser. No. 795,707

Claims priority, application Japan, Apr. 27, 1983, 58-72980

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—96.1 **8 Claims**

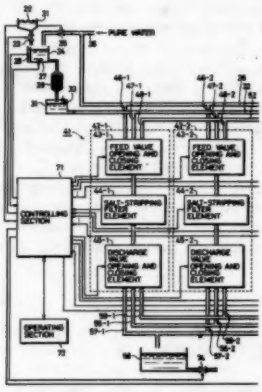
1. A dyestuff solution refining system to purify an aqueous

dyestuff solution containing inorganic salt contaminant comprising:

preparation means for producing a dyestuff solution;

refining means including (a) a chromatographic means for removing inorganic salt contaminant from said dyestuff solution; (b) transfer means for transferring said dyestuff solution to said chromatographic means; (c) discharge means for discharging said dyestuff solution from said chromatographic means; and (d) inorganic salt sensor means for detecting the inorganic salt concentration in said discharged dyestuff solution and for generating an output responsive to said detected inorganic salt concentration;

control means including (i) comparison means for receiving said output from said inorganic salt sensor means, for



comparing said output with a predetermined value, and for generating an output responsive to differences between said detected inorganic salt concentration and said predetermined value, (ii) fractionation means for fractionating said discharged dyestuff solution in response to said output from said comparison means into a portion having an inorganic salt concentration at or below said predetermined value and a portion having an inorganic salt concentration above said predetermined value; and (iii) circulation means for recycling said discharged dyestuff solution portion having an inorganic salt concentration above said predetermined value to said chromatographic means; and

a reservoir for collecting said discharged dyestuff solution portion having an inorganic salt concentration at or below said predetermined value.

4,698,152

OIL RECOVERY SYSTEMS

Noel Carroll, Sherbrooke Road, Sherbrooke, Victoria, Australia

PCT No. PCT/AU84/00151, § 371 Date Apr. 3, 1985, § 102(e) Date Apr. 3, 1985, PCT Pub. No. WO85/00851, PCT Pub. Date Feb. 28, 1985

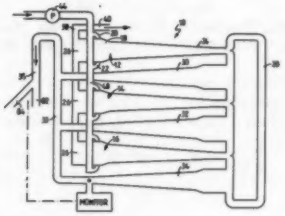
PCT Filed Aug. 3, 1984, Ser. No. 741,306

Claims priority, application Australia, Aug. 4, 1983, PG0664/83; Aug. 11, 1983, PG0778/83

Int. Cl.[4] B04C *5/14, 5/081, 5/13*

U.S. Cl. 210—96.1 **7 Claims**

1. An oil recovery system including: an iniet for crude oil from a well; a first separator in the form of a knock-out tank connected to receive said crude oil admitted to said inlet and for separation of the crude oil into gas-containing, oil-containing and water-containing componerts, said first separator having a first outlet for said gas-containing component, a second outlet for said oil-containing component and a third outlet for said water-containing component; a second separator of the cyclone type having an inlet connected to receive said water-containing component from said third outlet and arranged for separating said water-containing component into a water component and an oil component, said second separator having a fourth outlet for said separated oil component and a fifth outlet for said water component, said fourth and fifth outlets being separate from said inlet of said second cyclone separator; a recycling line selectively couplable between the fifth outlet and the inlet to said second separator for recycling said water component back to the second separator; valve means operatively interposed between said fifth outlet and said recycling line and a sixth outlet, and operative in one position to couple the fifth outlet to the sixth outlet, and in a second position to



couple the fifth outlet to the recycling line; control means for directing said water component from said fifth outlet to said sixth outlet when purity of said water component is above a predetermined value, and for directing said water component from said fifth outlet to said inlet of the second separator when the purity of said water component is below said predetermined valve, said recycling line being for controlling the selective coupling of the recycling line to the fifth outlet by controlling said valve means to effect either return of said water component to the second separator or to discharge the water component to the sixth outlet; and a further line connected to said fourth outlet of said second separator and opening to the interior of said knock-out tank for returning oil separated by the second separator means to the knock-out tank.

4,698,153

APPARATUS FOR PRODUCING ULTRA-PURE WATER BY ION EXCHANGE RESIN

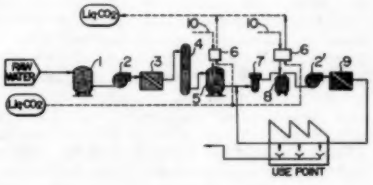
Harumi Matsuzaki, Hitachi; Masayoshi Kubota, Hitachiota; Katsuya Ebara, Moto; Sankichi Takahashi, Hitachi, and Minoru Kuroiwa, Abiko, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 7, 1985, Ser. No. 699,437

Claims priority, application Japan, Feb. 8, 1984, 59-19982

Int. Cl.[4] C02F *1/42*

U.S. Cl. 210—192 **14 Claims**



1. An apparatus for producing ultra-pure water which comprises an ion exchange resin desalting unit having an inlet for receiving raw water and an outlet and containing an ion exchange resin having surfaces from which projections of resin have been removed, a sterilizing unit having an inlet in fluid communication with said outlet of said desalting unit and

having an outlet, an ultrafiltration or membrane filtration unit having an inlet in fluid communication with said outlet of said sterilizing unit and having an outlet for ultra-pure water, and an ion exchange resin preparation unit for preparing said ion exchange resin prior to introduction into said ion exchange resin desalting unit, said ion exchange resin preparation unit comprising means for contacting an ion exchange resin having projections of resin on its surfaces with a high pressure gas to remove said projections and means for transferring said ion exchange resin having surfaces from which projections of resin have been removed to said desalting unit.

4,698,154

APPARATUS FOR FILTERING AND SEPARATING FLOWING MEDIA

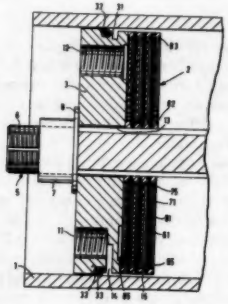
Jürgen Mohn, Rahewinkel 21, 2000 Hamburg 74, and Wilhelm Heine, Knickberg 1b, 2100 Hamburg 90, both of Fed. Rep. of Germany

Continuation of Ser. No. 634,875, Jul. 26, 1984, abandoned. This application Jul. 23, 1986, Ser. No. 890,790

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327431

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—232 **3 Claims**



1. In an apparatus for filtering and separating flowing media; said apparatus including a plurality of circular, disk-like filter elements which are connected in series as arranged in a stack having an inner periphery and are stacked against one another; each filter element including a plate-like carrier plate, a dish-shaped guide plate, and a membrane which is disposed between each carrier plate and guide plate and is covered with a filtering layer; said stack of filter elements having two ends, at each of which there is provided a wheel-shaped pressure plate; said pressure plates serving to clamp together the stack of filter elements via a clamping bolt along which permeate passes and which extends through the central holes of said filter elements; the improvement in combination therewith which comprises:

a pipe which serves as an outer extraordinarily pressure-resistant housing for said stack of filter elements removable in axial direction as an entire module block accessible for service and repair purposes, said pipe being open at both ends thereof; the inner diameter of said pipe being approximately the same as the diameter of said filter element stack; the outer periphery of each of said pressure plates being provided with annular grooves, each of which has at least one essentially radially extending side wall which diverges via an inclined surface toward one of the open ends of said pipe; and respective sealing rings disposed in said annular grooves so that accordingly upon encountering an excessive internal pressure, said side walls effect a secure closing by tight pressing of said sealing rings shiftable and slidable both radially and also axially outwardly along said inclined surface for reinforced sealing under pressure peripherally against the inner wall of said pipe although permeate is discharged along inner periphery of said stack which means along said clamping bolt rather than having peripherally outer discharge thereof and consequently individual plates are subjected accordingly only to differential pressures amounting to less bar of pressure;

said clamping bolt, which is centrally disposed through said filter elements, having in its outer surface, between said pressure plates, concentrically disposed filtrate outlet grooves which are adapted to communicate with a filtrate discharge line externally of said stack of filter elements;

both an inlet connection and an outlet connection in one of said pressure plates; and

means that form a cylindrical annular gap between the outer periphery of said filter element stack and the inner wall of said pipe in order to provide communication between one of said connections and that end of said stack of filter elements remote from said pressure plate which includes said inlet and outlet connections; the radially outer edges of said membranes being joined with the adjacent carrier plates in order to seal the radially outer portion of said filter element stack relative to said cylindrical gap; said filter elements being provided with axially disposed passages, and with seals which are alternately disposed on the inner and outer peripheries of said filter elements; said filter elements being connected together in such a way that when viewed in the radial direction, medium alternately flows over said membranes thereof from the inside to the outside, and from the outside to the inside.

4,698,155

METHOD OF AND APPARATUS FOR CONTINUOUS METERED REMOVAL OR ADDITION OF SMALL QUANTITIES OF FLUID

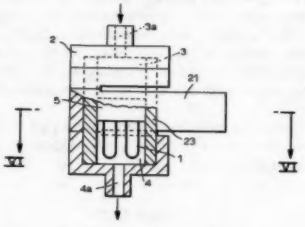
John Atkin, Corona del Mar, Calif., assignor to Akzo NV, Arnhem, Netherlands

Filed Jun. 27, 1985, Ser. No. 750,012

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1984, 3423737

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.6 **10 Claims**



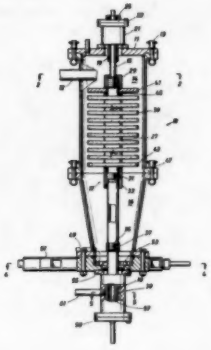
1. An apparatus for continuous meter removal or addition of small quantities of fluid over a prolonged period, comprising a fluid permeable membrane arranged so that the fluid passes through said membrane and therefore at least one very small uniform fluid stream is produced and maintained; a housing which limits an internal space, said fluid permeable membrane being arranged so as to subdivide said internal space of said housing into a first chamber and a second chamber for passing the fluid from said first chamber through said fluid permeable membrane into said second chamber, said housing having a casing provided with a flexible and elastic portion; a sealing block which holds said membrane and arranged in said flexible and elastic portion in a fluid-tight manner but not rigidly connected thereto; and means for partially surrounding said flexible and elastic portion and deforming the same.

4,698,156

ROTATING FILTER APPARATUS FOR SEPARATING FINE PARTICLES OF SOLIDS FROM A LIQUID

Norman R. Bumpers, Pearland, Tex., assignor to MicroSpun Technologies Inc., Houston, Tex.

Filed Apr. 3, 1986, Ser. No. 847,753
Int. Cl.[4] B01D *33/22*
U.S. Cl. 210—331 38 Claims



1. Rotating filter apparatus for separating suspended fine particles of solids from a liquid, comprising:

a chamber,

a hollow, rotatable vertical shaft located within said chamber and having a plurality of small openings therealong,

a plurality of stacked porous discs surrounding said shaft and connected thereto for rotation at at least one point,

a plurality of fluid impervious annular spacers surrounding said shaft, one of said spacers respectfully located between and spacing apart said respectively stacked discs,

said chamber including a tangential entry port for the inputting of the unfiltered solids and liquid under pressure,

said hollow shaft including an exit port for the discharge of the filtered liquid positioned sufficiently below said entry port to to cause said fine particles to fall out of suspension,

means for removing the collected filtered solids from said chamber, and

means for rotating said shaft in the same direction as the direction of entry for said unfiltered solids and liquid at a sufficient speed to prevent solid particle accumulation on at least a substantial portion of the surfaces of said stacked discs.

4,698,157

FILTER MEMBRANE AND METHOD OF MANUFACTURING IT

Jacques Gillot, Odos, France, assignor to Ceraver, S.A., Paris, France

Continuation of Ser. No. 487,680, Apr. 22, 1983, abandoned. This application Aug. 5, 1985, Ser. No. 763,305
Claims priority, application France, Apr. 28, 1982, 82 07298
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—496 5 Claims

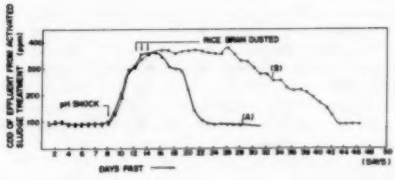
5. A filter membrane including at least one filter layer having an exposed surface and being composed of a sintered inorganic material in the form of grains which are fixedly connected to one another, said inorganic material being selected from the group consisting of metal oxides, silicon carbide, silicon nitride, silicon and aluminum oxynitrides (SiALON), borides, and glasses, wherein the improvement comprises the filter layer having been formed by depositing onto a porous support layer a thin slip consisting essentially of a thoroughly deflocculated suspension of fine grains of said organic material in a liquid vehicle, together with a dispersing agent in an amount sufficient to obtain thorough deflocculation of said grains and a thickening agent which does not hinder deflocculation, the porous support layer having pores of greater size than said filter layer, draining off excess slip so as to leave a thin uniform layer on the support, and baking the filter membrane at a temperature sufficient to sinter the grains of the inorganic material, such that the average roughness of the surface of said sintered filter layer over a distance along said surface equal to at least five times the average grain size is less than one fifth of the average grain size in the region in question.

4,698,158

PROCESS FOR TREATING INDUSTRIAL WASTEWATERS BY ACTIVATED SLUDGE

Masahiro Fujii; Minoru Kamada, and Shigeharu Matsubara, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 684,970, Dec. 21, 1984, abandoned, which is a continuation of Ser. No. 492,875, May 9, 1983, abandoned. This application Aug. 27, 1986, Ser. No. 902,069
Claims priority, application Japan, May 13, 1982, 57-79132; Dec. 25, 1982, 57-230962; Dec. 25, 1982, 57-230963; Mar. 28, 1983, 58-51840
Int. Cl.[4] C02F *3/12*
U.S. Cl. 210—610 12 Claims



1. A process for preventing occurrence of a decrease in the efficiency of biodegradation in activated sludge treatment of wastewaters generated in a process for production of coke, wherein said activated sludge treatment utilizes an aeration tank and a sludge settling tank, which process comprises

controlling the oxidation-reduction potential in said aeration tank at a level between +400 and +480 mV versus normal hydrogen electrode;

controlling the oxidation-reduction potential in said sludge settling tank at a level not less than +100 mV versus normal hydrogen electrode;

adding (1) at least one member selected from the group consisting of phytic acid, phytate salts and materials containing the same, in an amount of 1 to 100 g per cubic meter of the aeration tank per day for the phytic acid or phytate salts, or in an amount of 10 to 500 g per cubic meter of the aeration tank per day for the materials containing the same, and (2) at least one other phosphorous-containing compound to said aeration tank so that the concentration of the phosphorus-containing compound present in effluent from the activated sludge treatment plant is not more than 1 mg/1,000 ml as phosphorus; and

when said oxidation-reduction potential in said aeration tank is reduced by said addition of said member, increasing the reduced oxidation-reduction potential to a level not less than a value between +350 and +430 mV versus normal hydrogen electrode, by means of increasing aeration volume.

4,698,159

SEPARATING PROCESS

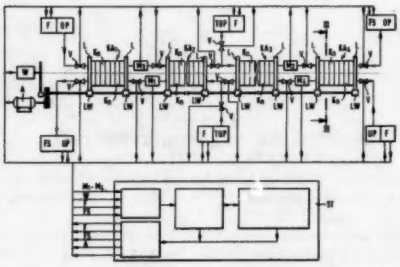
Max Brenner, Spiegelbergstrasse 33, 4059 Basle, Switzerland, assignor to Ciba-Geigy AG and Max Brenner, both of Basel, Switzerland, a part interest

Continuation of Ser. No. 159,529, Jun. 16, 1980, abandoned. This application Aug. 20, 1985, Ser. No. 767,253

Claims priority, application Switzerland, Jun. 19, 1979, 5710/79

Int. Cl.[4] B01D *11/04*

U.S. Cl. 210—634 **17 Claims**



1. A process which utilises the tendency of one or more dissolved substances to assume equilibrium of distribution between two non-miscible liquid phases in a separator apparatus comprising a cylindrical chamber unit rotatable about its central axis and connected to a rotary motor drive, the unit being divided by partitions normal to the rotational axis of the unit, into a plurality of chambers communicating with one another through apertures in a partitions eccentric to said axis, the flow rate of the two phases being adjustable so that they flow through the chamber unit as counter-currents, and the mixture containing the substance for isolation and accompanying substances being supplied to a place between the two end chambers of the chamber unit which may comprise one or more adjacent chambers; the process comprising monitoring the concentration of a substance (S), adjusting the flow ratio (R) of the two phases (OP, UP) so that the product of the set flow ratio (R') and the concentration ratio (K_s) for the required substance (S) is not equal to 1, so that the substance (S) receives a specific direction of migration through the chamber unit, and at the same time adjusting the flow ratio so that the concentration of the required substance (S) at or near the end of the chamber unit opposite to the direction of migration of the substance has a value differing from zero but not exceeding a top threshold value.

4,698,160

METHOD AND APPARATUS FOR PREPARING HEMODIALYSIS FLUIDS OF ACCURATELY PORTIONED COMPONENTS

Masato Haraguchi, Moriyama, Japan, assignor to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 335,488, Dec. 30, 1981, abandoned, which is a continuation of Ser. No. 124,351, Feb. 25, 1980, abandoned. This application Dec. 11, 1984, Ser. No. 680,248

Int. Cl.[4] B01D *13/00*

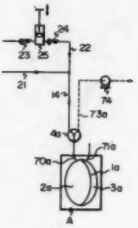
U.S. Cl. 210—647 **36 Claims**

1. In a method for preparing a mixed fluid of accurately portioned components for hemodialysis wherein at least two components are introduced into the chambers of a fixed volume closed receptacle to fill said chambers, and for delivering the resulting fluid, said receptacle having a pair of chambers separated by partition means, at least a part of which partition means is capable of being displaced to change the respective volumes of the chambers such that the amount of volume increase of one chamber is essentially identical to the corresponding volume decrease of another chamber, the steps which comprise:

a. accurately metering an amount of one or more of the fluid components by an independent means and introducing the metered fluid component(s) into one of said chambers of said receptacle,

b. introducing an unmetered amount of another of said fluid components into the same chamber of the receptacle to increase the volume of said chamber in an amount sufficient completely to fill said chamber, the unmetered amount being large in relation to the amount of said accurately metered component(s),

c. completing step (a) upon or before completion of the step (b),



d. closing a feed valve for controlling the feeding or fluid components into the increased volume chamber and then opening a delivery valve for delivering the accurately portioned fluid componenfs from the increased volume chamber in response to the completion of the displacement of the partition means,

e. alternately repeating the introduction of the fluid components into each chamber and the subsequent delivery of the accurately portioned fluid components from each said chamber, and

f. circulating the accurately portioned fluid components in a closed circuit comprising a dialysis cell and the chambers to perform hemodialysis.

4,698,161

POLYMER BLEND FOR DISPERSION OF PARTICULATE MATERIALS IN AQUEOUS SYSTEMS

Gerald D. Hansen, Holicong, Pa., assignor to Pony Industries, Inc., N.Y.

Continuation-in-part of Ser. No. 749,616, Jun. 27, 1985, abandoned. This application Dec. 23, 1985, Ser. No. 812,547

Int. Cl.[4] C02F *1/00*

U.S. Cl. 210—701 **6 Claims**

1. A method of dispersing particulate materials in an aqueous medium, which comprises introducing into the medium an amount effective to disperse said materials of a polymer blend consisting essentially of about 50 to 90% by weight of (A) a polyacrylic acid terminated by thioglycolic, bisulfite, or mercapto groups and about 50 to 1% by weight of (B) a water-soluble, dissociating low molecular weight polymer selected from the group consisting of (1) vinyl aromatic polymers and (2) polymers of 2-acrylamido-2-methylpropane sulfonic acid.

4,698,162
METHOD FOR PREVENTION OF METALLIC PRECIPITATE REOXIDATION/REDISSOLUTION IN AQUEOUS SYSTEMS

Lawrence J. Guilbault, Topsfield, and Jeffrey A. Ulman, Beverly, both of Mass., assignors to Morton Thiokol, Inc., Chicago, Ill.

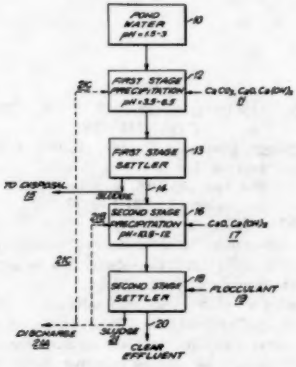
Filed Dec. 6, 1985, Ser. No. 806,151
Int. Cl.[4] C02F 1/52
U.S. Cl. 210—710 **16 Claims**

1. A process for preventing redissolution and reoxidation of metal precipitates in an aqueous complexing or oxidizing solution, said metal having been precipitated by chemical reduction, said process comprising adding to the aqueous solution, in an amount insufficient to cause precipitation of said metal but sufficient to prevent redissolution and reoxidation of the precipitate, a bicyclic, aromatic, organonitrogen compound.

4,698,163
TREATMENT OF PHOSPHATE-CONTAINING WASTEWATER

John F. Zibrida, St. Petersburg, Fla., assignor to AMAX Inc., Greenwich, Conn.

Filed Nov. 12, 1985, Ser. No. 796,821
The portion of the term of this patent subsequent to Apr. 14, 2004, has been disclaimed.
Int. Cl.[4] C02F 1/52
U.S. Cl. 210—713 **7 Claims**



1. A method for the treatment of contaminated wastewater of pH ranging from about 1.5 to 3 containing at least about 100 ppm phosphorus as phosphate ions and at least about 50 ppm fluorine as fluride ions which comprises:

treating said wastewater with an amount of an alkaline agent selected from the group consisting of limestone ($CaCO_3$) and lime sufficient to raise and maintain the pH at a level of about 3.5 to 6.5 following uniform mixing thereof in a first stage precipitation to effect substantial precipitation of said contaminants,

passing said treated wastewater to a first stage settler to effect solid/liquid separation thereof sufficient to provide a sludge of said precipitated contaminants which is removed for disposal thereof and provide an effluent substantially impoverished in said contaminants,

treating said contaminant-impoverished effluent in a second stage precipitation with lime in an amount sufficient to raise and maintain the pH of said effluent at a level of at least about 10.8 to less than 12 following uniform mixing thereof,

whereby a further precipitate of said contaminants is produced having improved settling properties,

passing said lime-treated effluent at said pH to a second stage settler at which a flocculant is added to provide flocs of said precipitate which settle rapidly to form a sludge thereof and a clearer effluent,

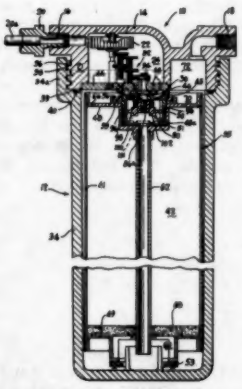
removing said sludge and discharging said effluent containing less than about 5 ppm phosphorus and less than about 10 ppm fluoride ions,

whereby a clearer effluent is provided characterized in that further precipitation of solids is substantially minimized or eliminated downstream of said effluent discharge.

4,698,164
FILTER APPARATUS

George S. Ellis, Chardon, Ohio, assignor to Kinetico, Inc., Newbury, Ohio

Filed Jul. 29, 1985, Ser. No. 760,251
Int. Cl.[4] B01D 27/02
U.S. Cl. 210—739 **21 Claims**



1. A filter apparatus comprising:

(a) a fluid monitoring assembly defining an inlet for receiving fluid under pressure;

(b) a replaceable filter element removably connected to said fluid monitoring assembly and defining a flow path from said inlet to an outlet and further including filtering material for filtering fluid conveyed along said flow path;

(c) said fluid monitoring assembly including sensing means responsive to fluid flow into said filter element and operative to provide a signal indicative of the quantity of fluid received at said inlet and delivered to said repalceable filter element;

(d) a valve member forming part of said filter element and movable from a first position in which fluid flow is allowed to flow along said flow path substantially unimpeded and a second position at which fluid flow along said flow path is blocked by said valve member;

(e) a valve actuating means responsive to said sensing means and operative to cause said valve member to move from said first to said second position upon receiving a predetermined signal from said fluid monitoring assembly;

(f) means for releasably coupling said valve actuating means with said fluid monitoring assembly.

11. A method for filtering fluid, comprising the steps of:

(a) providing a fluid monitoring head in communication with a source of fluid to be filtered;

(b) removably attaching a filter element to said head;

(c) monitoring the quantity of fluid conveyed through said filter by a sensing means responsive to fluid flow to said filter element;

(d) terminating fluid flow through said filter by blocking a fluid flow path defined by said filter with a blocking

means responsive to said sensing means and forming part of said filter when a predetermined quantity of fluid has been conveyed through said filter as measured by said monitoring head.

4,698,165

SHOCK TREATMENT OF AQUEOUS SYSTEMS

Thomas W. Theyson, Williamsport, Pa., assignor to Glyco Inc., Norwalk, Conn.

Filed Oct. 18, 1985, Ser. No. 789,012
Int. Cl.[4] C02F 1/76
U.S. Cl. 210—755 20 Claims

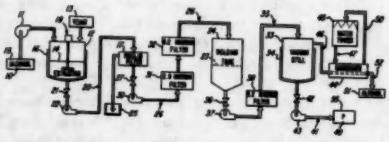
1. A process for the shock treatment of an aqueous system, said system having previously been treated with a dihalo 5,5-dialkyl hydantoin so as to control biological growth and resulting in an undesirable buildup of residual 5,5-dialkyl hydantoins, which comprises: adding a source of chlorine so as to increase the free chlorine level of said aqueous system to form about 5 to about 15 ppm in the presence of a sufficient amount of bromide ion to prevent the formation of monochloro-5,5-dialkyl hydantoins, and the subsequent degradation to N-chloroimines, as chlorine is added to the system.

4,698,166

METHOD AND APPARATUS FOR PRODUCING A PRODUCT WHICH STIMULATES SKIN RESPIRATION AND PRODUCT PRODUCED THEREBY

Michael E. Danner, Kenton Hills, Ky., and Thomas E. Hieber, Cincinnati, Ohio, assignors to Sperti Drug Products, Inc., Erlanger, Ky.

Filed Jan. 28, 1986, Ser. No. 823,226
Int. Cl.[4] B01D 13/00
U.S. Cl. 210—774 20 Claims



1. In a method of producing a product which stimulates skin respiration said method comprising the steps of, mixing bakers yeast and alcohol in an extractor to produce a slurry of solids and liquid, heating said slurry to a predetermined temperature to produce a heated slurry, holding said heated slurry at said predetermined temperature for a predetermined time period, passing said heated slurry through a filter to remove said solids and produce a filtered liquid, placing said filtered liquid in a sterile vacuum still, and boiling said filtered liquid in said vacuum still to drive off a substantial percentage of the liquid therein and produce said product, the improvement in said method comprising the further steps of providing a bacteria/-spore forming agent-free product which stimulates skin respiration by further filtering said product in a closed pressure filtering system followed by filtering of said further filtered product through a sterile filter.

4,698,167

DETERGENT WITH FABRIC SOFTENER

James C. T. Burckett St. Laurent, Overijse, and Alfred Busch, Grimbergen, both of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 632,572, Jul. 19, 1984, abandoned. This application May 30, 1986, Ser. No. 868,477
Claims priority, application United Kingdom, Aug. 11, 1983, 8321683
Int. Cl.[4] D06M 1/24
U.S. Cl. 252—8.8 6 Claims

1. A method for imparting softening and anti-static properties to fabrics, said method comprising the steps of

(a) laundering said fabrics in an aqueous laundry bath containing from 0.10% to 1.5% by weight of a detergent composition containing at least 0.1% by weight of an amine-fatty acid complex involving hydrogen bonding and formed from a fatty acid of the formula RCOOH and an amine of the formula $R_1R_2R_3N$ wherein R is C_9 to C_{20}, R_1 is C_6 to C_{20}, R_2 is C_6–C_{20}, and R_3 is C_1 to C_{10} or hydrogen, the complex having an amine:fatty acid ratio of from about 1:2 to about 1:0.5 and being in the form of particles having a particle size in the range of from 0.1 to 20 microns,

(b) line drying said fabrics after said laundering in aqueous laundry bath.

4,698,168

CORROSION INHIBITOR FOR WELL ACIDIZING TREATMENTS

Garry L. Briggs, Edmonton, Canada, assignor to Hughes Tool Company, Houston, Tex.

Filed Aug. 29, 1986, Ser. No. 902,356
Int. Cl.[4] E21B 43/27
U.S. Cl. 252—8.553 2 Claims

1. A treatment fluid useful for increasing the permeability of a subterranean formation in the vicinity of a borehole penetrating the formation, comprising:

an aqueous solution of an acid selected from the group consisting of hydrochloric acid, hydrofluoric acid, formic acid, acetic acid, citric acid, and mixtures thereof, the acid being present in an amount effective to increase the permeability of the formation being treated; and

an effective amount of a corrosion inhibiting composition which prevents the formation of sludge, the corrosion inhibiting composition comprising a mixture of:

80–90 weight percent propargyl alcohol;

5–10 weight percent 2 ethoxy ethanol;

0.5–3.0 weight percent polyethylene glycol having the structural formula:

$$HO(C_2H_4O)_nH$$

where n=2–6;

0.5–3.0 weight percent 4-nonyl phenol polymer with formaldehyde and oxirane;

0.05–2.0 weight percent tarbases;

0.5–3.0 weight percent 2-(phenylmethyl)isoquinolinium chloride;

0.05–2.0 weight percent 1-(phenylmethyl)quinolinium chloride;

0.05–2.0 weight percent 2 methyl-1-(phenylmethyl) quinolinium chloride;and

0.05–2.0 weight percent 4 methyl-1- (phenylmethyl) quinolinium chloride, all weight percents being based on the total weight of corrosion inhibiting composition.

4,698,169

REACTION PRODUCTS OF ALKENYLSUCCINIC COMPOUNDS WITH AROMATIC AMINES AND LUBRICANT COMPOSITIONS THEREOF

Harry J. Andress, Jr., Wenonah, and Henry Ashjian, E. Brunswick, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 1, 1986, Ser. No. 858,406
Int. Cl.[4] C10M *133/44, 139/00*
U.S. Cl. 252—49.6 17 Claims

1. A product of reaction made by (a) reacting (i) an alkenylsuccinic compound with (ii) a secondary amine of the formula:

ANHB (I)

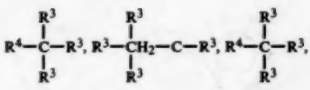
wherein A and B, which may be the same or different, are each independently an aromatic group or an alkyl substituted aromatic group, and (b) reacting the product of step (a) with (iii) a compound selected from the group consisting of an alkanolamine of the formula:

$(HOR^1)_xN(H)_y$ (II)

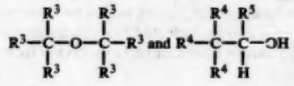
wherein R^1 is an alkylene group having 1 to 6 carbon atoms, x is 1 to 3 and y is 0 to 2, the sum of x and y being 3, an aminomethane of the formula:

$(HOR^2)_{x'}C(H)_{y'}NH_2$ (III)

wherein R^2 is the same as R^1 and x' and y' have the same meaning as x and y, respectively, and a hindered alcohol selected from the group having the following general formulae:



(IV) (V) (VI)



(VII) (VIII)

wherein R^3 and R^4 are each selected from CHOH, CH_2OH, and CH_3 and R^5 is selected from H or an alkyl group of from about 4 to 22 carbon atoms and wherein reaction (a) is carried out at temperatures from about 100°–200° C. and reaction (b) is carried out at temperatures of from about 100° to about 300° C. with the reactants being present in a molar ratio of alkenylsuccinic compound to secondary amine to alkanolamine or aminomethane of about 1:0.1–1:0.1–1.2 or alkenylsuccinic compound to secondary amine to hindered alcohol of about 1:0.1–1:0.5–1.

4,698,170

PROCESS FOR THE PREPARATION OF VERY HIGHLY ALKALINE, CALCIUM-BASED DETERGENT-DISPERSANT ADDITIVES AND PRODUCTS PRODUCED THEREFROM

Jean-Louis Le Coent, Le Havre, France, assignor to Rhone-Poulenc Recherches, Courbevoie, France

Filed Jul. 9, 1984, Ser. No. 628,895
Claims priority, application France, Jul. 11, 1983, 83 11494
Int. Cl.[4] G10M *129/00, 135/00*
U.S. Cl. 252—33.2 19 Claims

1. A process of preparing detergent-dispersant additives, comprising the steps of: (a) mixing an alkyl-benzenesulfonic acid, an alkylphenol, diluent oil, halogen ions and lime to produce a reaction product including water, wherein (i) the molar ratio of the alkylphenol to the alkylbenzenesulfonic acid is from about 0.4 to about 10, (ii) the ratio of the number of moles of lime to the sum of the number of moles of the alkylphenol and the number of moles of the alkylbenzenesulfonic acid is from about 2.6 to about 8, and (iii) the molar ratio of the halogen ions to the lime is from about 0.005 to about 0.15; (b) removing water from the reaction product; (c) reacting the reaction product with sulfur in the presence of glycol and at least one additional alcohol having a boiling point in excess of about 155° C. to sulfurize said product, wherein (i) the molar ratio of the sulfur to the alkylphenol is from about 0.6 to about 2, (ii) the molar ratio of the glycol to the lime is from about 0.03 to about 0.6, and (iii) the molar ratio of the additional alcohol having a boiling point in excess of about 155° C. to the glycol is from about 0.1 to about 30; (d) carbonating the sulfurized product; (e) removing glycol and alcohol from the carbonated sulfurized product; and (f) filtering the material obtained in step (e) to remove sediment from the material and to recover the final product.

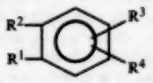
4,698,171

SYNTHETIC ORGANIC POLYMERS FOR THE SELECTIVE FLOCCULATION OF TITANIUM AND IRON ORES

Vincenzo Bertini, Cosenza; Anna Marabini, Frascati; Angela De Munno, Pisa; Maria Barbaro, Rome, and Marco Pocci, Surdo Di Rende, all of Italy, assignors to Consiglio Nazionale Delle Ricerche, Rome, Italy

Filed Jan. 13, 1986, Ser. No. 818,305
Int. Cl.[4] C09K *3/00*
U.S. Cl. 252—60 9 Claims

1. Selective flocculating agents for titanium and iron ores, said agents consisting of polymers and copolymers containing, as their monomeric units, the monomers corresponding to the following formula I:



I

wherein R^1 and R^2 which are the same or different from each other, represent a bridging group of the formula —O—CH-R^5—O—, or they are hydroxyl groups which can also be in the form of their ether or ester derivatives, and in which formula one of the symbols R^3, R^4 or R^5 corresponds to an atomic group containing, at a position variably spaced from the substitution site, a polymerizable functional group wherein R^3 and R^4 are other than the acyl radical of acrylic or methacrylic acid, whereas the other ones, which can be the same or different from each other, and being selected from the group consisting of hydrogen atoms, alkyl groups, aryl groups, hydroxyl groups, alkoxy groups, hydroxyalkyl groups, alkoxyalkyl groups, haloalkyl groups, carbonyl groups, carboxyl groups, ester groups, amido groups, nitro groups, sulfonic groups, halogen atoms, and nitrilo groups.

4,698,172

AIRCRAFT ANTI-ICING FLUID CONTAINING CARRAGEENAN

Richard J. Tye, Wiscasset; George E. Lauterbach, Thomaston, and Philip R. Standel, Lamoine, all of Me., assignors to FMC Corporation, Philadelphia, Pa.

Filed Aug. 4, 1986, Ser. No. 892,980
Int. Cl.[4] C09K *3/18*
U.S. Cl. 252—70 17 Claims

2. An anti-icing fluid suitable for ground treatment of aircraft which comprises a glycol-based aqueous solution containing gel-forming carrageenan in an amount sufficient to thicken the fluid to promote its adherence to aircraft surfaces when applied to a stationary aircraft but also allow for its wind shear-induced removal during the takeoff run prior to rotation.

4,698,173

DEICING COMPOSITIONS

Charles N. Hansen, 1448 S. 17th East, Salt Lake City, Utah 84108

Filed Nov. 24, 1986, Ser. No. 933,860
Int. Cl.[4] C09K 3/18
U.S. Cl. 252—70 11 Claims

1. A deicing composition consisting essentially of ammonium carbamate and urea in granular form in the range of proportions by weight of 99.5% to 4% ammonium carbamate and 0.5% to 96% urea.

5. A deicing composition consisting essentially of ammonium carbamate and either sodium hydroxide, sodium orthosilicate or potassium hydroxide.

4,698,174

ADDITIVES FOR DETERGENTS AND CLEANING AGENTS

Walter Denzinger, Speyer; Heinrich Hartmann, Limburgerhof; Wolfgang Trieselt, Ludwigshafen; Albert Hettche, Hessheim; Rolf Schneider, Mannheim, and Hans-Juergen Raubenheimer, Ketsch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 27, 1986, Ser. No. 822,610
Claims priority, application Fed. Rep. of Germany, 35-04896
Int. Cl.[4] C11D 0/6
U.S. Cl. 252—174.24 10 Claims

1. A pulverulent and/or granular additive for pulverulent detergents and cleaning agents, which consists of:

(A) from 80 to 20% by weight of (i) at least one copolymer consisting of from 40 to 90% by weight of (meth)acrylic acid and from 60 to 10% by weight of maleic acid, (ii) at least one copolymer consisting of from 10 to 45% by weight of (meth)acrylic acid, from 10 to 45% by weight of maleic acid and from 10 to 60% by weight of at least one hydroxy(C_{2-6})alkyl (meth)acrylate, or (iii) mixtures of copolymers (i) and (ii), said copolymers (i) and (ii) optionally being in the form of water-soluble salts;

(B) from 20 to 80% by weight of nitrilotriacetic acid or its mono-, di- or trisodium or mono-, di- or tripotassium salt; and

(C) from 0 to 20% by weight of at least one additive conventionally used for detergent and cleaning agent formulations.

4,698,175

NEODYMIUM HYDROXY/AMMONIUM NITRATE

Claire Gourlaouen; Claude Magnier, both of Paris; Bertrand Latourrette, Le Rainey; Anne Tugaye, Bougival, and Francoise Deneuve, Paris, all of France, assignors to Rhone-Poulenc Specialties Chimiques, Courbevoie, France

Filed Jul. 11, 1986, Ser. No. 884,630
Claims priority, application France, Jul. 11, 1985, 85/10618
Int. Cl.[4] C09K 3/00; C01F 17/00
U.S. Cl. 252—182 13 Claims

1. A compound having the formula (I):

$$Nd(OH)_x(NO_3)_y \cdot n\ NH_4NO_3 \cdot z\ H_2O \quad (I)$$

wherein $2 \leqq x \leqq 2.3$, $0.7 \leqq y \leqq 1.0$, $0.8 \leqq z \leqq 1.25$, and $0.8 \leqq n \leqq 1.25$.

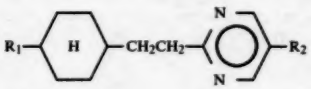
4,698,176

HETEROCYCLICALLY SUBSTITUTED ETHANES AND THEIR USE IN LIQUID CRYSTAL MATERIALS AND DEVICES

George W. Gray, Cottingham, and Beatrice M. Nicholas, South Harrow, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

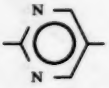
Division of Ser. No. 688,987, Jan. 4, 1985, Pat. No. 4,632,515.
This application Sep. 29, 1986, Ser. No. 912,262
Claims priority, application United Kingdom, Jan. 11, 1984, 8400665
Int. Cl.[4] C09K 19/34; C09D 239/00, 239/02
U.S. Cl. 252—299.61 5 Claims

1. A heterocyclic compound having a formula:



wherein

represents a trans-1,4-disubstituted cyclohexyl ring;



represents a 2,5 disubstituted 1,3 pyrimidine ring; R_1 represents an alkyl group having from 1 to 15 carbon atoms and R_2 represents a group selected from hydrogen, alkyl having from 1 to 15 carbon atoms and alkoxy having from 1 to 15 carbon atoms.

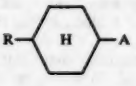
4,698,177

CYCLOHEXYLCYCLOHEXENE DERIVATIVES

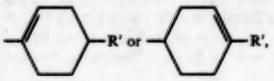
Yasuyuki Tanaka, Tokyo; Haruyoshi Takatsu, Kodaira, and Kiyohumi Takeuchi, Tokyo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Apr. 11, 1986, Ser. No. 850,585
Claims priority, application Japan, Apr. 16, 1985, 60-79239; May 27, 1985, 60-113597
Int. Cl.[4] C07C 13/00; C09K 19/30
U.S. Cl. 252—299.63 8 Claims

1. A nematic liquid crystalline composition for electro-optical display materials comprising a mixture of matrix liquid crystals and at least one viscosity-reducing agent represented by the formula



wherein R denotes a linear alkyl group having 1 to 9 carbon atoms, A denotes



R′ denotes a linear alkyl group having 1 to 9 carbon atoms and each cyclohexane ring is arranged in a trans(equatorial-equatorial) form.

4,698,178

USE OF POLYOXYALKYLENE-POLYSILOXANE COPOLYMERS WITH SILICON-LINKED, LONG-CHAIN ALKYL RADICALS AS EMULSIFIERS FOR THE PREPARATION OF WATER/OIL EMULSIONS

Rudolf Hüttinger; Hans-Joachim Kollmeier, both of Essen; Rolf-Dieter Langenhagen, Hattingen-Niederwenigern; Alfred Walter, and Wilhelm Wolfes, both of Essen, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

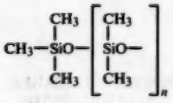
Filed Sep. 19, 1985, Ser. No. 777,593

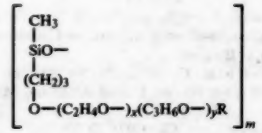
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 3436177

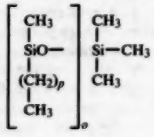
Int. Cl.[4] B01J *13/00;* **B01F** *17/04*

U.S. Cl. 252—309 **3 Claims**

1. An emulsion prepared by the method comprising preparation of a water/oil emulsion wherein the oily phase is or contains silicone oil by mixing the oily phase with water in the presence of an emulsifier, the improvement which comprises said emulsifier being present in an emulsifying effective amount and being a copolymer having the average formula:







in which

R is an alkyl adical with 1 to 4 carbon atoms or a hydrogen radical;

n=10 to 200;

m=1 to 25;

o=1 to 100 with the proviso that o is not less than m, and 3 o is less than n in the average molecule;

p=7 to 17; and wherein the molecular weight of the $(C_2H_4O—)_x(C_3H_6O—)_yR$ radical is 250 to 2,000 with x and y being selected so that the weight ratio of oxyethylene to oxypropylene is 100:0 to 20:80.

4,698,179

ELECTRIC CONDUCTIVE AND SLIDING RESIN MATERIAL

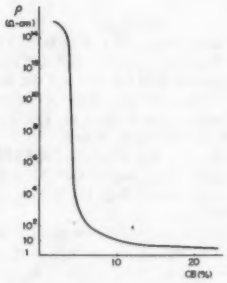
Osamu Suzuki, Toyota; Eizi Asada, Okazaki, and Tatsuhiko Fukuoka, Aichi, all of Japan, assignors to Taiho Kogyo Co., Ltd., Aichi, Japan

Continuation of Ser. No. 645,365, Aug. 29, 1984, abandoned. This application May 23, 1986, Ser. No. 870,281

Claims priority, application Japan, Aug. 31, 1983, 58-158092; Aug. 31, 1983, 58-158093; Aug. 31, 1983, 58-158094

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 **21 Claims**



1. A conductive and sliding resin material having an improved electric conductivity and improved sliding characteristics and comprising (A) a thermoplastic resin selected from the group consisting of polyphenylene oxide, polyphenylene sulfide, polybutylenephthalate, polyamide, polycarbonate and polyacetal and (B) finely divided polytetrafluoroethylene, said polytetrafluoroethylene being present in an amount of from about 0.6% to 25% by weight; and dispersed in said resins, (C) 3 to 40% by weight of graphite and (D) carbon black in an amount effective to enhance the electric conductivity of said material.

4,698,180

TERPENE ETHER AROMA CHEMICALS

Mark S. Pavlin, Lawrenceville, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed May 23, 1986, Ser. No. 866,396

Int. Cl.[4] A61K *7/46;* **C11B** *9/00;* **C07C** *43/18*

U.S. Cl. 252—522 R **2 Claims**

1. A perfume composition having a woody tone, which comprises; an effective amount for olfactory detection of the olfactory tone, of isobornyl 2-hydroxypropyl ether; and a perfumery acceptable carrier.

4,698,181

DETERGENT COMPOSITIONS CONTAINING TRIETHYLENETETRAMINEHEXAACETIC ACID

William K. Lewis, Sharonville, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 30, 1986, Ser. No. 880,605

Int. Cl.[4] C11D *1/10, 3/33*

U.S. Cl. 252—527 **24 Claims**

1. A laundry detergent composition substantially free of peroxygen compounds, comprising:

(a) from about 1% to about 75% by weight of a detergent surfactant selected from the group consisting of anionic surfactants, nonionic surfactants, zwitterionic surfactants, ampholytic surfactants, cationic surfactants, and mixtures thereof;

(b) from about 5% to about 80% by weight of a detergency builder; and

(c) from about 0.3% to about 10% by weight triethylenetet-

raminehexaacetic acid, or alkali metal, alkaline earth, ammonium or substituted ammonium salts thereof, or mixtures thereof.

3. The composition of claim 1 wherein the detergency builder component is selected from the group consisting of alkali metal silicates; alkali metal carbonates; phosphates; polyphosphates; phosphonates; C_{10}–C_{18} alkyl monocarboxylic acids, polycarboxylic acids, alkali metal, ammonium or substituted ammonium salts thereof; and mixtures thereof.

4,698,182

HEXAGONAL PLATE-LIKE BARIUM FERRITE PARTICLES FOR MAGNETIC RECORDING AND PROCESS FOR PRODUCING THE SAME

Norimichi Nagai; Nanao Horiishi, both of Niroshima; Masao Kiyama, and Toshio Takada, both of Kyoto, all of Japan, assignors to Toda Kogyo Corp., Japan

Filed Sep. 24, 1984, Ser. No. 654,194

Claims priority, application Japan, Oct. 12, 1983, 58-191556

Int. Cl.[4] C04B *35/26*

U.S. Cl. 252—62.59 15 Claims

1. A process for producing hexagonal plate-like barium ferrite particles for magnetic recording, represented by the formula (I):

$$BaFe_{12-x-y}M_xTi_yO_{19} \quad (I)$$

wherein x and y are independently 0.6 to 1.2 and M is Co(II) or Co(II) and a divalent metal of Fe(II), Zn(II) or Mn(II), having the width of said particle of 0.1 to 0.4 um and a BET specific surface area (S) of 30 to 50 m^2/g, and showing a magnetization (M) of larger than 40 emu/g in a magnetic field of 10 KOe and a coercive force (Hc) of 500 to 1000 Oe, which process comprising autoclaving an aqueous highly alkaline suspension of ferric hydroxide containing Ti(IV), Ba(II) and Co(II) and a divalent metal of Fe(II), Zn(II) or Mn(II) as M at a temperature in the range of from 250° to 330° C. tO form ferromagnetic hexagonal plate-like particles of the formula (I) wherein x, y and M are the same as defined above andhaving a width of said particles of 0.04 to 0.4 um, treating the thus obtained particles with an aqueous solution containing Si(IV), and subjecting the thus treated particles to thermal treatment at a temperature of 700° to 900° C.

4,698,183

HIGH LIGHT OUTPUT-SHORT DURATION CHEMILUMINESCENT COMPOSITIONS

Anthony Koroscil, Escambia, Fla., assignor to American Cyanamid Company, Stamford, Conn.

Filed Feb. 4, 1986, Ser. No. 826,052

Int. Cl.[4] C09K *11/00*; C07D *233/02*

U.S. Cl. 252—700 15 Claims

1. An activator composition adapted to produce a chemiluminescent light of high light output for a short duration when admixed with an oxalate solution comprising a mixture of from about 5% to about 15%, by weight, based on the weight of the oxalate solution, of an oxalate and from about 0.16% to about 0.36%, by weight, same basis, of a fluorescer, comprising a solution of hydrogen peroxide and a mixture of from about 0.01% to about 0.08%, by weight, based on the total weight of said composition, of sodium salicylate and from about 0.01% to about 0.08%, by weight, same basis, of sodium 5-bromosalicylate, the ratio of sodium salicylate to sodium 5-bromosalicylate ranging from about 9:1 to about 1:9 respectively.

4,698,184

TELLURIUM IMAGING COMPOSITION INCLUDING IMPROVED REDUCTANT PRECURSOR AND METHOD

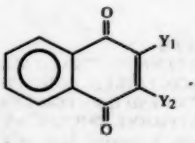
Terry T. Yu, Mt. Clemens, and Mei-Rong Yen, Troy, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Division of Ser. No. 599,949, Apr. 13, 1984, Pat. No. 4,532,078, which is a division of Ser. No. 392,586, Jun. 28, 1982, Pat. No. 4,460,678. This application May 9, 1985, Ser. No. 732,069

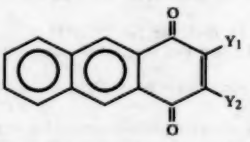
Int. Cl.[4] C07C *50/12, 50/16, 5/24*

U.S. Cl. 260—396 R 3 Claims

1. A method of synthesizing a naphthoquinone of the formula



or an anthraquinone of the formula



where Y_1 is alkoxy having less than 6 carbon atoms and Y_2 is chloro, comprising:

adding slowly a reactive metal alkoxide corresponding to the desired alkoxy to a suspension of 2,3-dichloro-1,4-naphthoquinone at about ice bath temperature, to form the naphthoquinone, or 2,3-dichloro-1,4-anthraquinone, to form the anthraquinone.

4,698,185

PROCESS FOR PRODUCING DEGUMMED VEGETABLE OILS AND GUMS OF HIGH PHOSPHATIDIC ACID CONTENT

Albert J. Dijkstra, Kortrijk, and Martin Van Opstal, Izegem, both of Belgium, assignors to Safinco Coordination Center N.V., Kortrijk, Belgium

Filed Mar. 13, 1986, Ser. No. 839,286

Claims priority, application United Kingdom, Mar. 18, 1985, 8506907

Int. Cl.[4] C07F *9/10*

U.S. Cl. 260—403 15 Claims

1. A process for producing degummed vegétable oils and gums of high phosphatidic content by removing non-hydratable phosphatides and iron from water degummed vegetable oils comprising the following stages:

(a) in a first stage, finely dispersing a non-toxic agueous acid in the water degummed oil, said acid being selected from the group consisting of phosphoric aicd, citric acid, oxalic acid and tartaric acid, the degree of dispersion being at least such that 10 million droplets of said aqueous acid per gram of oil are present and the contact time of said aqueous acid with said water degummed oil being sufficient to complete the decomposition of the metal salts of phosphatidic acid,

(b) in a second state, mixing a base into the acid-in-oil dispersion in such quantity that the pH of the aqueous phase is increased to above 2.5 without any substantial amount of soap being produced, said base being selected from the group consisting of caustic soda, sodium silicate, soda ash and calcium carbonate; and

(c) in a third stage, separating the dispersion into an aqueous

phase containing said gums and an oil phase consisting of acid oil, said oil phase optionally being washed with water.

4,698,186

PROCESS FOR THE PRE-ESTERIFICATION OF FREE FATTY ACIDS IN FATS AND OILS

Lutz Jeromin; Eberhard Peukert, both of Hilden, and Gerhard Wollmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 821,109

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1985, 3501761

Int. Cl.⁴ C11C *3/04, 3/10*

U.S. Cl. 260—421 **11 Claims**

1. A continuous process for the pre-esterification of a fat or oil to reduce the free fatty acid content thereof prior to transesterification comprising:

(a) passing a crude fat or oil of vegetable or animal origin in admixture with methanol in a molar ratio of methanol to the free fatty acid content of the fat or oil of from about 10:1 to 50:1, at a temperature of from about 55° C. to 65° C., over a fixed bed, heterogeneous pre-esterification catalyst which is a solid, acidic, anion exchange resin comprising a polymer matrix having bound thereto free sulfonic acid groups, to pre-esterify free fattya cid and reduce the acid value of the fat or oil to below about 1;

(b) separating the pre-esterified fat or oil from the fixed bed catalyst and passing the separated fat or oil through evaporator means for evaporating water and residueal methanol from the oil phase into the vapor phase to purify and dry the pre-esterified fat or oil; and

(c) separately recovering purified, dired, pre-esterified fat or oil with an acid value below about 1, and methanol.

4,698,187

PREPARATION OF CARBOXYLIC ACID ANHYDRIDES

Colin Hewlett, Middlesbrough, England, assignor to The Halcon SD Group, Inc., Little Ferry, N.J.

Continuation of Ser. No. 196,228, Oct. 14, 1980, abandoned, which is a continuation-in-part of Ser. No. 394,220, Sep. 4, 1973, abandoned. This application Nov. 15, 1985, Ser. No. 798,764

Int. Cl.⁴ C07C *51/54, 51/56*

U.S. Cl. 260—546 **8 Claims**

1. A process for the preparation of acetic anhydride which comprises reacting methyl bromide or methyl iodide with carbon monoxide in a first reaction zone in the presence of a rhodium catalyst and a promoter for said catalyst at a temperature of 20°–500° C. under a carbon monoxide partial pressure of 0.1–15,000 psi to produce acetyl bromide or acetyl iodide, distilling the resulting reaction mixture to recover said thus-produced acyl bromide or iodide from said first reaction zone and reacting said thus-recovered acetyl bromide or iodide under substantially anhydrous conditions at a temperature of 0°–300° C. in a second reaction zone with a reactant consisting essentially of methyl acetate or dimethyl ether to produce said acetic anhydride and to regenerate said methyl bromide or iodide and distilling the reaction mixture produced in said second reaction zone to separate said acetic anhydride from the remaining components of the reaction mixture of said second reaction zone, said promoter comprising a lithium component.

4,698,188

EVAPORATION AIR HUMIDIFIER

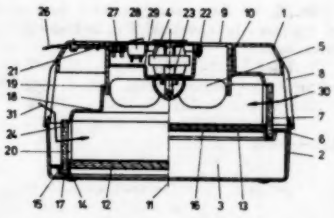
Franz Gutmann, Rebstein, Switzerland, assignor to Plaston AG, Widnau, Switzerland

Filed Jun. 20, 1986, Ser. No. 877,003

Claims priority, application Switzerland, Apr. 21, 1986, 01613/86

Int. Cl.⁴ B01F *3/04*

U.S. Cl. 261—107 **4 Claims**



1. An air humidifier comprising:

a housing having air inlet opening means for receiving dry air thereinto and air outlet opening means for delivering humidified air therefrom;

an electrically driven air ventilation unit for drawing the dry air into said inlet opening means and forcing the humidified air from said outlet opening means, said air ventilation unit comprising a drive unit and a fan blade and being located in said housing,

an evaporation mat located in the air stream through said housing for humidifying the dry air,

said housing comprising an upper part and a lower part defining a water chamber and an intermediate part which floats on water in said water chamber, said intermediate part having no rigid connection with said upper and lower housing part and being movable along the axis of said housing as the level of water in the water chamber varies,

said intermediate part having a bottom surface covering the entire water surface and preventing said dry inlet air from contacting the water in said water chamber, a float element in the zone of its bottom surface, and a portion supporting said evaporation mat in a position where said evaporation mat projects at least partially below the surface of the water so that said mat is wetted by the water,

said air humidifier further comprising an air conducting pipe surrounding said ventilation unit, and said intermediate part including a wall attached to the upper portion of said evaporation mat and constantly slidingly engaging said air conducting pipe during movement of said intermediate part along the housing axis thereby separating the dry air received through said air inlet opening means from the humidified air delivered through said air outlet opening means and causing the dry air to flow only through said evaporation mat.

4,698,189

METHOD FOR THE MANUFACTURE OF VITREOUS CARBON BODIES

Ernst Tetzlaff, Heidenheim, Fed. Rep. of Germany, assignor to SIGRI GmbH, Meitingen bei Augsburg, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 820,192

Claims priority, application European Pat. Off., Jan. 18, 1985, 85100496.0

Int. Cl.⁴ B29C *71/04*

U.S. Cl. 264—22 **5 Claims**

1. Method for the manufacture of vitreous carbon bodies from thermoplastic materials, which comprises, forming a thermoplastic material containing aromatic groups selected from the group consisting of polyphenylene oxide, polysul-

fone, polyether sulfone and polyether ether ketone into a body, irradiating the body with beta rays with an energy dose of at least 1 MJ/kg at a temperature below the softening temperature of the material and carbonizing the body by heating in an inert atmosphere to a temperature of at least 800° C.

4,698,190

METHOD AND APPARATUS OF CONTROLLING GRANULATION OF MOISTURE-ABSORBING POWDER MATERIAL

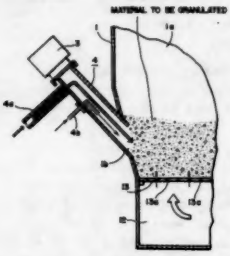
Takeo Shibata, and Kazumasa Nagasawa, both of Shizuoka, Japan, assignors to Kabushiki Kaisha Okawaraseisakusho, Shizuoka, Japan

Filed Apr. 14, 1986, Ser. No. 851,447

Claims priority, application Japan, Sep. 2, 1985, 60-193435; Sep. 12, 1985, 60-202248; Oct. 21, 1985, 60-233450

Int. Cl.[4] B29B *9/08;* **B29C** *67/02*

U.S. Cl. 264—40.2 **2 Claims**



1. An apparatus for performing a method for controlling granulation of moisture absorbing power material wherein the fluidized powder material to be granulated is contained in a fluidization chamber by forced air or agitation, a binder is added to said material and said materials are formed into granules by agglomerating and particle forming, said apparatus comprising:

a fluidization chamber for containing said powder material;

a binder liquid spray means for spraying a binder liquid supplied by a binder feed pump to said fluidization chamber;

a detecting tube connected at the lower portion of one wall of said fluidization chamber;

an infrared absorption-type moisture meter for directly and continuously detecting the moisture content of said powder material within said fluidization chamber in a non-contact manner, said infrared absorption-type moisture meter being connected to the opposite end of said detecting tube as said fluidization chamber;

a main purging tube means for blowing a main purging air supplied from an external air source into the fluidized powder material through the detecting tube so that the powder material does not enter the detecting tube, said main purging tube being connected to said detecting tube nearest the end connected to said infrared absorption-type moisture meter; and

a second purging tube means for blowing a sub-purging air from the external air source into the lower portion of the inner surface of said detecting tube to remove powder material which is deposited on the bottom of said detecting tube, said sub-purging tube means being connected to said detecting tube at about the middle portion of said detecting tube.

2. In a method for controlling granulation of moisture absorbing powder material wherein the fluidizing powder material to be granulated is contained in a fluidization chamber by forced air or agitation, a binder is added to said material and said materials are formed into granules by agglomerating and particle forming;

the improvement wherein said method further comprises detecting the moisture content of said powder material within said fluidization chamber in a non-contact manner by an infrared absorption-type moisture meter, connecting said infrared absorption-type moisture meter to said fluidization chamber by a detecting tube, connecting to said detecting tube a main purging tube at said detecting tube near the end closest to said infrared absorption-type moisture meter and connecting an external air source to said main purging tube, activating said external air source to provide air to said detecting tube so that the powder material is prevented from entering said detecting tube, connecting a sub-purge tube to said detecting tube at the middle portion of said detecting tube, connecting said sub-purge tube to said external air source, and activating said external air source so that powder material which is deposited on the lower portion of the inner surface of said detecting tube is removed.

4,698,191

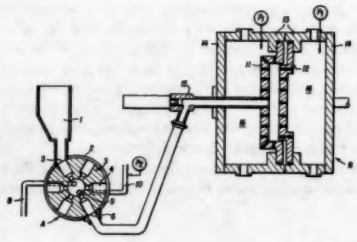
METHODS OF PRODUCING MOLDED PRODUCTS FROM FOAMED POLYPROPYLENE PARTICLES

Hiroshi Endo; Masakazu Arai; Shigeo Nishikawa; Masanori Saito; Masahiro Tanaka; Kunikazu Nagasaki, and Shigeki Mathuno, all of Mie, Japan, assignors to Mitsubishi Yuka Badische Co., Ltd., Yokkaichi, Japan

Filed Jan. 29, 1986, Ser. No. 823,733

Int. Cl.[4] C08J *9/22*

U.S. Cl. 264—50 **7 Claims**



1. A method of producing a polypropylene resin molded product from foamed polypropylene particles, which comprises introducing a pressurizing gas into foamed polypropylene partilces having closed cells so that the particles have an internal gas pressure of from 0.3 to 2.5 Kg/cm^2G, charging the particles in a mold cavity while compressing the particles with a pressurizing inorganic gas until the initial apparent volume of the particles is reduced to 50 to 99%, removing the gas from the mold cavity while keeping the foamed particles in a co-pressed state, and introducing steam in the cavity to cause adhesion of the compressed foamed particles.

4,698,192

APPARATUS FOR MANUFACTURING A LAMINATED UNIT OF CERAMIC GREEN SHEETS

Saburo Kuze; Yoshiharu Kato, and Shozo Kojima, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Mar. 21, 1985, Ser. No. 714,381

Claims priority, application Japan, Mar. 28, 1984, 59-61709

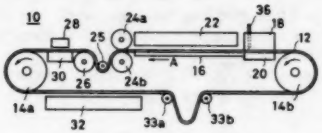
Int. Cl.[4] B29C *31/02, 39/20*

U.S. Cl. 264—101 **19 Claims**

1. A method of manufacturing a unit of laminated ceramic green sheets, comprising the steps of:

(a) applying ceramic slurry on an endless belt running in a predetermined direction to a predetermined thickness, said belt being driven continuously through an applying location while carrying out said applying step;

(b) curing said applied ceramic slurry and thereby forming a ceramic green sheet;
(c) applying a further coating of ceramic slurry on said cured ceramic green sheet;
(d) curing said further coating of ceramic slurry applied on said ceramic green sheet and thereby forming a further ceramic green sheet;



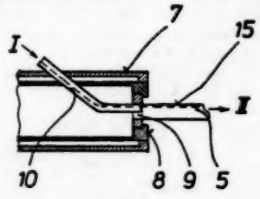
(e) driving said belt to carry at least one of said ceramic green sheets to a printing location following the formation thereof;
(f) printing an electronic material paste on said at least one ceramic green sheet, said belt being driven intermittently through said printing location while carrying out said printing step; and
(g) drying said printed electronic material paste.

4,698,193

METHOD AND APPARATUS FOR PRODUCING SEALING STRIPS AND SIMILAR PROFILED STRIPS OF RUBBER AND RUBBER-LIKE ELASTOMERS

Bernhard Bernitz; Richard Brodmann, both of Hanover, and Dietmar Hermann, Garbsen, all of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Feb. 21, 1986, Ser. No. 832,817
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506410
Int. Cl.[4] B29C *47/02, 47/12*
U.S. Cl. 264—171 **9 Claims**



1. A method of producing a profiled strip of rubber or rubber-like elastomer, with an overlay strip of one material being disposed on, and bonded to a portion of the outer, cross-sectional periphery of a base main strip of a second, different material, said overlay strip extending over the entire length of said main strip; said method comprising the steps of:
providing a prefabricated overlay strip made of plastic having on that surface facing away from said main strip a friction-reducing synthetic material that is capable of sliding, and having on that surface that faces said main strip an adhesive material that is capable of adhering to said main strip;
stretching said overlay strip in the longitudinal direction thereof, and placing said overlay strip in such a stretched state, on said main strip;
combining the prefabricated overlay strip with said main strip in the extrusion head of an extrusion press;
extruding said overlay strip and said main strip together through extrusion orifice means of said extrusion head to form a profiled strip; and
finally vulcanizing said thus-formed profiled strip.

6. An extrusion press for producing a profile strip of rubber or rubber-like elastomer, with a prefabricated overlay strip of friction-reducing synthetic material being disposed on, and bonded adhesively to a portion of the outer, cross-sectional periphery of a base main strip of a second, different material, said overlay strip extending over the entire length of said main strip, said press comprising:
an extrusion head including a terminating mouthpiece that defines an extrusion die orifice at a discharge end thereof;
a guide means connected to said terminating mouthpiece for combining a prefabricated overlay strip with said main strip in the extrusion head of the extrusion press when passing said overlay strip and said main strip together through extrusion die orifice of said extrusion head to form a profiled strip; said guide means for introducing said overlay strip into said extrusion head having a discharge side thereof delimited by said extrusion die orifice and arranged for effecting stretched combining of said overlay strip with said main strip; said guide means being in the form of a guideway that is connected to an outer wall of said extrusion die orifice in such a way that it extends counter to the direction in which said main strip is discharged from said extrusion head for final vulcanizing of said thus formed profiled strip.

4,698,194

PROCESS FOR PRODUCING ULTRA-HIGH-TENACITY POLYVINYL ALCOHOL FIBER

Hiroyoshi Tanaka; Mitsuo Suzuki, and Fujio Ueda, all of Ehime, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

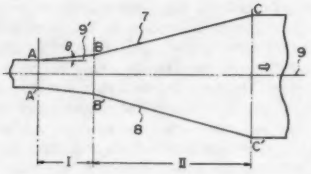
Division of Ser. No. 680,721, Dec. 12, 1984, Pat. No. 4,603,083.
This application Mar. 12, 1986, Ser. No. 838,977
Claims priority, application Japan, Dec. 12, 1983, 58-232692; Dec. 12, 1983, 58-232691
Int. Cl.[4] D01F *6/14*
U.S. Cl. 264—185 **4 Claims**

1. A process for producing an ultra-high-tenacity polyvinyl alcohol fiber which comprises the steps of dissolving polyvinyl alcohol having a degree of polymerization of at least 1500 in a solvent, extruding the resulting polymer solution from a spinneret through a layer of air or inert gas into a coagulating bath wherein the polymer solidifies to form coagulated filaments, and drawing the coagulated filaments at a total effective draw ratio of at least 20 times;
said solvent being at least one member selected from the group consisting of dimethyl sulfoxide, glycerin, ethylene glycol, diethylene triamine, and ethylene diamine, said polymer solution having a viscosity of 100 to 5000 poise as measured when it emerges from the spinnerette; and
said coagulating bath being a liquid selected from the group consisting of methanol, ethanol, butanol, acetone, benzene, toluene, mixtures thereof with dimethyl sulfoxide, and saturated solutions of inorganic salts.

4,698,195
PROCESS FOR PREPARING BIAXIALLY DRAWN POLYAMIDE FILMS

Tsuguo Okumura, Tsukuba; Naomichi Yamagishi, Inashiki; Kazuharu Abe; Masayoshi Sugiyama, both of Tsuchiura, and Kenji Mori, Inashiki, all of Japan, assignors to Mitsubishi Monsanto Chemical Co., Tokyo, Japan

Filed Aug. 16, 1985, Ser. No. 766,632
Int. Cl.[4] B29C *55/14*
U.S. Cl. 264—235.8 **5 Claims**



1. A process for the preparation of a biaxially drawn polyamide film, which comprises: drawing a substantially amorphous unoriented polyamide film in the longitudinal direction at a temperature of 45° C. to 65° C., a rate of deformation of at least 10,000% /min and a draw ratio of 2.7 to 3.5 by a roll type longitudinal drawing method to form a longitudinally drawn film; transferring the longitudinally drawn film to a position of starting the drawing in the lateral direction at a temperature adjusted to 45° C. to 60° C., within a time represented by formula (I):

$$t \leq e^{(3.9-0.053T_1)} \qquad (I)$$

wherein

e represents the base of the natural logarithm, t represents the time in between the point of termination of the drawing in the longitudinal direction and the point of starting of the drawing in the lateral direction, and T_1 represents the temperature of the film during this period of time, which is within the range of from 45° C. to 60° C.,

the thickness profile of the longitudinally drawn film at said position of starting the drawing in the lateral direction, is gradually reduced from the side end portions (tenter clip holding portions) with respect to the lateral direction, toward the central portion with respect to the lateral direction, so that the thickness of the film at the central portion with respect to the lateral direction is 75 to 90% of the thickness of the film at the side end portions with respect to the lateral direction; and drawing the longitudinally drawn film in the lateral direction at an average rate of deformation of 2,000 to 10,000%.min and a draw ratio of 3 to 5 by a tenter type lateral drawing method wherein, until the mechanically set draw ratio between respective tenter clips exceeds 1.4 times the orginal distance, the film is expanded at an angle not greater than 6° with respect to the center line, in the lateral direction of the film, at a tenter clip temperature T_2 satisfying the condition $T_2 < T_1$, the film temperature being elevated stepwise from the position of starting the drawing in the lateral direction, to a film temperature at the position of termination of the drawing in the lateral direction, of from 70° C. to 100° C.

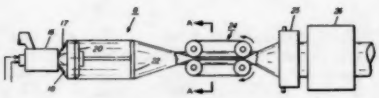
4,698,196
METHOD AND APPARATUS FOR EXTRUDING CREASELESS THIN WALLED TUBES

Ellis Fabian, N. York, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 24, 1985, Ser. No. 813,291
Int. Cl.[4] B29D *23/22*
U.S. Cl. 264—565 **13 Claims**

1. A process for preparing seamless, creaseless, pliable, thin-walled tubes comprising extruding a continuous moving tube of polymeric film material from a die into the ambient atmosphere, radially stretching said continuous tube over a sizing disk as said polymeric film material emerges from said die, maintaining a pillow of pressurizing air within said tube in the region between said die and said sizing disk, longitudinally stretching said tube, maintaining the downstream free end of said tube open to the ambient atmosphere and free of creases, and severing said tube while maintaining the cross-sectional shape of said tube free of creases and while said tube is in motion thereby forming at least one tube segment having a right cylinder configuration substantially free of creases.

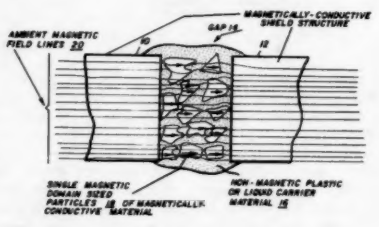
5. Apparatus for preparing seamless, creaseless, pliable, thin-walled tubes comprising means to extrude a moving continuous tube of molten polymeric film material from a die into the ambient atmosphere, means to radially stretch said continuous tube as it emerges from said die, a disc shaped sizing means supported by said die, said disc shaped sizing means having a continuous outer circumferential periphery adapted to contact the interior of said tube and form an air pillow in cooperation with said tube and said die, means to introduce a fluid under pressure through said die into said air pillow, and means to longitudinally stretch said tube while maintaining the downstream free end of said tube open to the ambient atmosphere and free of creases, and means to sever said tube while said tube is in motion to form tube segments while maintaining said tube substantially free of creases.



4,698,197
MAGNETIC SHIELDING

John A. Kerns, Livermore; Roger R. Stone, Walnut Creek, and Joseph Fabyan, Livermore, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 12, 1985, Ser. No. 701,010
Int. Cl.[4] G21B *1/00*
U.S. Cl. 376—142 **22 Claims**


MAGNETICALLY-CONDUCTIVE SHIELD STRUCTURE
AMBIENT MAGNETIC FIELD LINES 20
GAP 14
10
12
SINGLE MAGNETIC DOMAIN SIZED PARTICLES 18 OF MAGNETICALLY-CONDUCTIVE MATERIAL
NON-MAGNETIC PLASTIC OR LIQUID CARRIER MATERIAL 16

1. A multi-part magnetic shield comprising:

at least two magnetically-conductive structures substantially enclosing a predetermined volume, each structure enclosing a portion of the volume, but having a predetermined gap disposed between juxtaposed portions thereof and disposed substantially transversely to magnetic field lines passing through the magnetically-conductive structures; and

a filler material disposed within said gap and including a non-magnetically conductive carrier in a liquid or plastic state having single-magnetic-domain-sized particles of a magnetically conductive solid dispersed therewithin, said

particles having a maximum cross-sectional dimension not exceeding 0.002 inch.

21. A magnetically conductive filler for filling a gap within a magnetically conductive structure, comprising:

(a) a carrier material, and

(b) single-magnetic-domain-sized particles of magnetically conductive material dispersed throughout said carrier material, said particles having a maximum cross-sectional dimension not exceeding 0.002 inch, said particles also having a maximum cross-sectional dimension which is substantially less than the size of a gap to be filled.

4,698,198

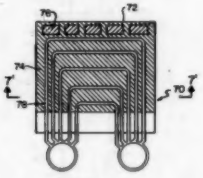
UNIFIED FIRST WALL-BLANKET STRUCTURE FOR PLASMA DEVICE APPLICATIONS

Dieter M. Gruen, Downers Grove, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation of Ser. No. 485,529, Apr. 15, 1983, abandoned. This application Feb. 4, 1986, Ser. No. 828,078

Int. Cl.⁴ G21B *1/00*

U.S. Cl. 376—146 **5 Claims**



1. In a nuclear reaction plasma device for generating neutron streams having a plasma and a structure serving as both the first wall and the blanket, said structure comprising

a first wall for containment of plasma at elevated temperatures, said first wall adjoining and exposed to an inner plasma zone thereby providing a first barrier to said plasma and

a blanket containing multiple channels for channeling helium and multiple passages for channeling water through the blanket, said blanket being for generation of sensible heat from the neutron streams, said first wall comprising an inner surface for exposure to the plasma, the inner surface and the blanket being of a one-piece structure initially composed of a metallic solid solution containing a major amount of copper and about 15–25 at. % of lithium and melting above about 500° C., and wherein said blanket includes means for adding lithium vapor to the helium gas being channeled to the blanket for replacing lithium converted to tritium, the walls of said channels being composed of a material which will allow transfer of tritium from said blanket into said helium gas passing through said channels and transfer of said lithium vapor from said helium gas into said blanket.

4,698,199

RETRACTABLE DUCT CONNECTORS IN A NUCLEAR REACTOR

Graham Chesworth, Warrington, and Garth J. Aspden, Bolton, both of England, assignors to National Nuclear Corporation Limited, London, England

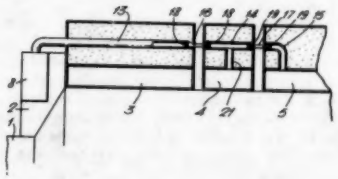
Filed Mar. 19, 1985, Ser. No. 713,632

Claims priority, application United Kingdom, Apr. 6, 1984, 8408903

Int. Cl.⁴ G21C *11/08, 9/00*

U.S. Cl. 376—206 **5 Claims**

1. A nuclear reactor having a roof in which shields are mounted for rotation and provided with ducting for the supply of gaseous coolant to the roof and shields characterised in that said ducting comprises ducts associated respectively with the roof and the shields and arranged to register with each other across the roof/shield and shield/shield gaps when the roof and said shields are in predetermined angular relation with each other, and further characterised in that the aligned ducts are connected to one another by connectors which bridge said gaps and are capable of being removed into one of the ducts which they interconnect so as to allow the shields to be rotated



relative to the roof and to one another, and in which each connector is mounted for sliding movement in at least one of said ducts and is movable from an operative position in which it slidably engages within at least one of the ducts, and bridges the gap between a pair of ducts, and an inoperative position in which the connector is retracted into one of said pair of ducts to such an extent that it is clear of the other duct and thereby does not obstruct said relative rotation.

4,698,200

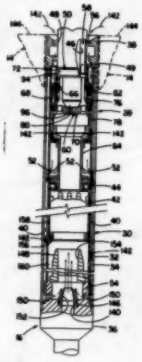
SELF-ACTUATED NUCLEAR REACTOR SHUTDOWN SYSTEM USING INDUCTION PUMP TO FACILITATE SENSING OF CORE COOLANT TEMPERATURE

Robert K. Sievers, N. Huntingdon; Martin H. Cooper, Churchill, and Robert B. Tupper, Greensburg, all of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 23, 1985, Ser. No. 812,045

Int. Cl.⁴ G21C *7/02*

U.S. Cl. 376—233 **16 Claims**



1. In a nuclear reactor including at least one fuel assembly having an upper end from which exits coolant after flowing upwardly through and being heated within said fuel assembly and at least one reactivity control assembly disposed adjacent said fuel assembly and having a bottom nozzle with an inlet, a top nozzle with an outlet, radially spaced outer and inner elongated ducts extending between and mounted at respective upper and lower ends to said nozzles, at least one neutron absorber bundle disposed in said inner duct for movement between raised and lowered positions axially along said inner duct and a driveline for moving said absorber bundle, said

ducts defining an annular space extending between said nozzles, said top nozzle outlet being disposed adjacent said upper end of said fuel assembly, a self-actuated shutdown system incorporated in said reactivity control assembly which comprises:

(a) a tubular member extending through said outlet of said top nozzle so as to define an outer annular flow channel through said top nozzle outlet between said member and said top nozzle;

(b) a latching mechanism disposed between said driveline and said absorber bundle and including mating means and sensing means, said mating means being matable for interconnecting said driveline and said bundle together to hold said bundle in said raised position and unmatable for releasing said bundle from said driveline to drop said bundle to said lowered position, said mating means also defining an outer flow passage extending between and in flow communication with said inner duct and said outer flow channel of said top nozzle, said sensing means being sensitive to temperature and cooperable with said mating means for causing mating thereof when the temperature sensed is below a known temperature and unmating thereof when the temperature sensed is above a given temperature, said sensing means being positioned in communication with said outer flow passage of said mating means;

(c) orifice means defining at least one flow opening through said inner duct above said absorber bundle so as to establish flow communication between said inner duct and said annular space between said inner and outer ducts; and

(d) pumping means disposed adjacent said bottom nozzle and in flow communication with said inlet thereof and said inner duct below said absorber bundle, said pumping means being operable to receive primary coolant flow from said bottom nozzle inlet and create an upward driving flow of said primary coolant through said absorber bundle, said pumping means establishing flow communication between said absorber bundle and said annular space at said inner duct lower end such that said upward driving flow of primary coolant, in turn, creates a suction head within said outer flow channel of said top nozzle and thereby an auxiliary downward flow of a portion of the heated coolant exiting from said upper end of said adjacent fuel assembly through said outer flow channel to said pumping means via said outer flow passage of said latching mechanism, said opening of said orifice means through said inner duct and said annular space between said ducts such that the temperature of said heated coolant exiting from said upper end of said adjacent fuel assembly can be sensed directly by said temperature sensitive sensing means of said latching mechanism.

4,698,201

HEAT EXCHANGER EQUIPPED WITH EMERGENCY COOLING MEANS AND FAST NEUTRON NUCLEAR REACTOR INCORPORATING SUCH AN EXCHANGER

Jean Massé, Manosque, France, assignor to Commissariat a l'Energie Atomique and Electricite de France Service National, both of Paris, France

Filed Jan. 31, 1985, Ser. No. 696,732

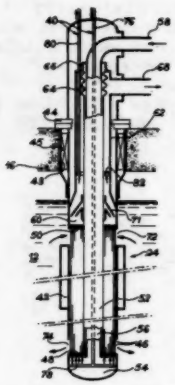
Claims priority, application France, Feb. 14, 1984, 84 02214

Int. Cl.[4] G21C *15/18*

U.S. Cl. 376—298 **5 Claims**

1. A heat exchanger incorporating a vertically axed cylindrical envelope, in which is located a bundle of vertical tubes, whose ends are respectively fixed to a lower tube plate and to an upper tube plate and which respectively issue into an inlet chamber and an outlet chamber for a secondary liquid, an intake pipe and a discharge pipe for the secondary liquid respectively communicating with the inlet chamber and the outlet chamber, and inlet and outlet for a primary fluid formed in that part of the envelope which surrounds the bundle of tubes, wherein the exchanger also comprises emergency cooling means for the primary fluid incorporating an inlet pipe and an outlet pipe which are connectable to external cooling means and which respectively issue into the inlet chamber and the outlet chamber for the secondary liquid below the intake and discharge pipes.

2. A fast neutron nuclear reactor comprising a vessel filled with liquid metal and sealed at its upper end by a slab, at least one pump ensuring the circulation of liquid metal between the reactor core and at least one heat exchanger suspended on the slab, wherein said heat exchanger comprises a vertically axed cylindrical envelope, in which is located a bundle of vertical tubes, whose ends are respectively fixed to a lower tube plate and to an upper tube plate and which respectively issue into an inlet chamber and into an outlet chamber for an secondary



liquid, an intake pipe and a discharge pipe for the secondary liquid respectively communicating with the inlet chamber and the outlet chamber, and an inlet and an outlet for a primary fluid formed in that part of the envelope surrounding the bundle of tubes, the exchanger comprising additionally an emergency cooling means for the primary fluid having an inlet pipe and an outlet pipe which are connectable to external cooling means which respectively issue into the inlet chamber and into the outlet chamber for the secondary liquid below said intake and discharge pipes, the primary fluid being the liquid metal contained in the vessel, whilst the reactor also comprises external cooling means connected between the exchanger inlet and outlet pipes.

4,698,202

PROCESS FOR INSTALLATION FOR THE CONTROLLED DISCHARGE OF ACTIVITY FROM A REACTOR CONTAINMENT STRUCTURE OF A GAS-COOLED NUCLEAR POWER PLANT

Winfried Wachholz, Gorxheim, and Ulrich Weicht, Weinheim, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 477,978, Mar. 23, 1983, abandoned. This application Mar. 25, 1986, Ser. No. 843,796

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1982, 3212265

Int. Cl.[4] G21C *9/00*

U.S. Cl. 376—300 **16 Claims**

1. A nuclear power plant installation comprising:

a reactor containment structure housing a gas-cooled nuclear reactor, and serving as a barrier against the release of radioactive cooling gas to the environment;

a discharge stack separate from said reactor containment structure;

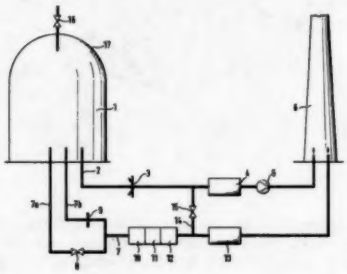
a primary discharge circuit from said reactor containment structure to said discharge stack for carrying a flow of discharge including cooling gas leakages which occur

during normal operation from said containment structure to said discharge stack;

a secondary discharge circuit from said reactor containment structure to said discharge stack for carrying a flow of discharge from said containment structure to said discharge stack;

said primary discharge circuit and secondary discharge circuit having separate outlets from the containment structure and inlets to said discharge stack;

means disposed within said primary discharge circuit for closing the flow of discharge to said primary discharge



circuit upon the occurrence of a first set of predetermined conditions in said reactor containment structure;

means disposed within said secondary discharge circuit for opening the flow of discharge to said secondary circuit upon the occurrence of a second set of predetermined conditions in said reactor containment structure wherein said secondary discharge circuit outlet comprises a first conduit and a second conduit and said means for opening includes means for actively controlling pressure in said first conduit and means for passively controlling pressure in said second conduit.

4,698,203

GAS-COOLED NUCLEAR REACTOR WITH A BED OF SPHERICAL FUEL ELEMENTS

Claus Ehlers, Viernheim, and Josef Schoening, Hambruecken, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Cologne, Fed. Rep. of Germany

Continuation of Ser. No. 326,364, Dec. 1, 1981, abandoned. This application Oct. 15, 1984, Ser. No. 659,877

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1980, 3047959

Int. Cl.[4] G21C *15/00*

U.S. Cl. 376—343 **16 Claims**

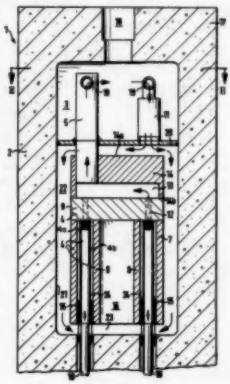
1. A gas-cooled nuclear reactor comprising:

a pressure vessel;

a reactor core arranged on a first horizontal plane in said pressure vessel, said reactor core having concentric annular walls arranged to form an annular space for retaining a plurality of spherical fuel elements in said annular space in said reactor core;

a plurality of steam generators arranged on a second horizontal plane in said pressure vessel above said reactor core;

a plurality of blowers inside said pressure vessel arranged in combination with a coolant path for circulation directing of cooling gas from the bottom of the reactor core through said annular space to the top of the reactor, each of said blowers and said steam generators arranged next to one another above said reactor core; and



a hot gas collector chamber above said reactor core, said chamber being in communiction with said steam generators.

4,698,204

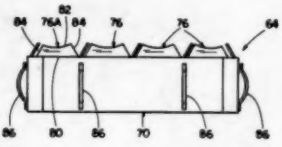
INTERMEDIATE FLOW MIXING NONSUPPORT GRID FOR BWR FUEL ASSEMBLY

Rusi P. Taleyarkhan, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 17, 1986, Ser. No. 908,139

Int. Cl.[4] G21C *3/34*

U.S. Cl. 376—439 **16 Claims**



1. An intermediate flow mixing nonsupport grid for use in a nuclear reactor fuel assembly containing an array of elongated fuel rods, said grid comprising:

(a) a plurality of interleaved inner straps arranged in an egg-crate configuration to define a plurality of inner cell openings for receiving therethrough respective ones of said fuel rods, said inner straps having outer terminal end portions;

(b) an outer peripheral strap attached to said respective terminal end portions of said inner straps to define a plurality of perimeter cell openings for receiving therethrough other ones of said fuel rods, said inner straps and outer strap together having opposite upstream and downstream sides;

(c) a first group of mixing vanes disposed at said downstream side and being attached on portions of said outer strap and on respective portions of said inner straps which together with said outer strap portions define said perimeter cell openings, each of said mixing vanes of said first group extending generally in a downstream direction and inwardly toward said perimeter cell openings for deflecting coolant flowing therethrough; and

(d) a second group of mixing vanes disposed at said downstream side and being attached on other portions of said inner straps which together with said respective portions thereof define said inner cell openings, each of said mixing

vanes of said second group extending generally in a downstream direction and inwardly toward said inner cell openings for deflecting coolant flowing therethrough;

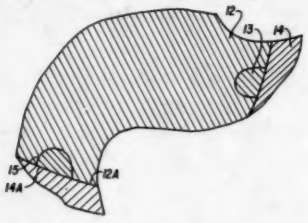
(e) said mixing vanes of said second group being substantially smaller in size than said mixing vanes of said first group so as to generate substantially less turbulence in the portions of the coolant flowing through said inner cell openings than in the portions of the coolant flowing through said perimeter cell openings.

4,698,205

BODY WITH INTERNAL CHANNELS AND METHODS OF PRODUCING THE SAME

Rolf G. Oskarsson, Rönninge; Johan P. Von Holst and Erik G. Eriksson, both of Sandviken, all of Sweden, assignors to Santrade Limited, Lucerne, Switzerland

Filed Dec. 20, 1985, Ser. No. 811,398
Claims priority, application Sweden, Dec. 20, 1984, 8406501
Int. Cl.[4] B22F *7/08;* B23P *15/32*
U.S. Cl. 419—5 **9 Claims**



1. A method of producing a metal tool, such as a cutting tool, having at least one coolant channel therethrough, comprising the steps of:

forming a body by:

providing a core having a fore-to-aft dimension and a first surface,

providing a cover against said core such that a second surface of said cover opposes said first surface and forms therewith an interface between said core and cover,

one of said core and cover provided in powder form, and the other of said core and cover provided in non-powder form, and

providing a metallic filler material in a fore-to-aft extending groove formed at said interface in one of said first and second surfaces such that said filler material contacts said core and said cover,

subjecting said body to compaction pressure and heat at a compaction temperature lower than the melting temperature of said filler material to permanently unite said powder material of said one of said core and said cover, and

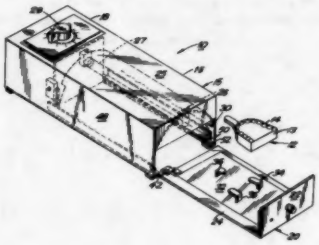
removing said filler material such that said groove defines a coolant channel.

4,698,206

METHOD FOR DISINFECTING DENTAL IMPRESSIONS

Donald M. Nevin, Woodbury, N.Y., assignor to Buffalo Dental Manufacturing Co., Inc., Syosset, N.Y.

Filed Sep. 11, 1985, Ser. No. 774,772
Int. Cl.[4] A61L *2/00*
U.S. Cl. 422—24 **11 Claims**



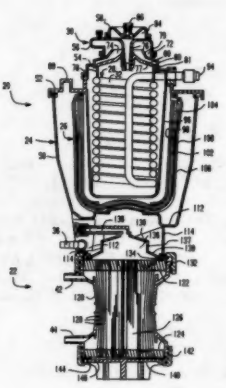
1. A method for disinfecting a surface of a dental impression comprising exposing the surface of the impression to but no more than about 2500 microwatts of ultraviolet light power per square centimeter for up to about 2 minutes.

4,698,207

INTEGRATED MEMBRANE OXYGENATOR, HEAT EXCHANGER AND RESERVOIR

Richard L. Bringham, San Clemente; Lucas S. Gordon, Laguna Beach, and Karl E. Mosch, Irvine, all of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jul. 14, 1986, Ser. No. 885,207
Int. Cl.[4] A61M *1/16*
U.S. Cl. 422—46 **6 Claims**



1. A blood oxygenator comprising

an upper bowl-like housing having a bottom with blood outlet means and a top with blood inlet means,

said upper housing forming a receptacle for accumulating varying amounts of venous blood,

a heat exchanger coil mounted within the housing and having a plurality vertically arranged convolutions,

said upper housing inlet means including means for directing incoming blood flow over the convolutions of the heat exchanger coil,

a defoamer mounted within the upper housing and inter-

posed between the heat exchanger and the upper housing outlet to remove air bubbles in the blood passing to the upper housing outlet,

a lower housing mounted on the bottom of the upper housing,

gas-permeable, liquid-impermeable membrane means mounted in the lower housing and forming separate blood and gas flow paths, and

said lower housing having blood inlet means and blood outlet means communicating with respective opposite ends of the blood flow path, and having gas inlet means and gas outlet means communicating with respective opposite ends of the gas flow path.

4,698,208

APPARATUS FOR MULTIPOLYMER SYNTHESIS OF ORGANIC COMPOUNDS

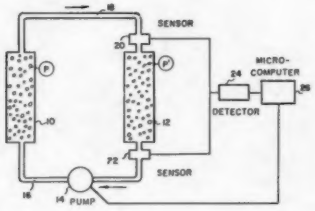
Abraham Patchornik, Ness Ziona; Yechiel Shai, Yehud, and Shimeon Pass, Kiryat Ono, all of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Division of Ser. No. 507,443, Jun. 24, 1983, Pat. No. 4,552,922, which is a continuation-in-part of Ser. No. 506,862, Jun. 22, 1983, abandoned. This application Jun. 10, 1985, Ser. No. 743,074

Claims priority, application Israel, Jun. 22, 1982, 66094

Int. Cl.[4] G05D *7/00*

U.S. Cl. 422—62 **8 Claims**



1. An apparatus for organic synthesis, comprising:

a first column including first support means for supporting a first polymer;

a second column including second support means for supporting a second polymer;

a first conduit connecting one end of said first column to one end of said second column;

a second conduit connecting the other end of said first column to the other end of said second column;

first detection means disposed in said first conduit for detecting a physical or chemical property of any material flowing therein when in use and providing an output signal proportional thereto;

second detection means, disposed in said second conduit, for detecting a physical or chemical property of any material flowing therein when in use and providing an output signal proportional thereto, said first and second detection means being constructed so as to measure the same physical or chemical property;

pump means for circulating material within said columns and conduits; and

analyzing and control means connected to said first and second detection means and to said pump means, for analyzing the output signals from said first and second detection means and for controlling said pump means to operate in accordance with predetermined instructions which are dependent upon the results of said analysis.

4,698,209

DEVICE FOR SENSING AN OXYGEN CONCENTRATION IN GASEOUS BODY WITH A SOURCE OF PUMP CURRENT FOR AN OXYGEN PUMP ELEMENT

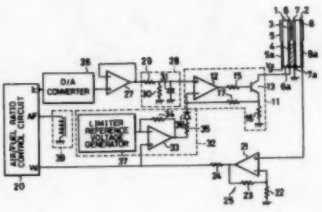
Kenshiro Hashimoto, Tokyo, and Yasushi Okada, Fujimi, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1986, Ser. No. 875,455

Claims priority, application Japan, Jun. 21, 1985, 60-136479

Int. Cl.[4] G01N *27/00, 27/26, 30/96*

U.S. Cl. 422—88 **6 Claims**



1. An air/fuel ratio control system for controlling an air/fuel ratio of an internal combustion engine in accordance with an oxygen concentration in an exhaust gas of said internal combustion engine, including an oxygen concentration sensing device which comprises:

an oxygen sensing unit being sensitive to oxygen in an oxygen-containing gas and operative to produce an output signal having a magnitude proportional to the concentration of oxygen in the oxygen-containing gas when contacted by a stream of the gas and having a sensor cell element made of a first active plate of an oxygen-ion conductive solid electrolyte and a first pair of electrodes sandwiching said first active plate, an oxygen pump element made of a second active plate of an oxygen-ion conductive solid electrolyte and a second pair of electrodes sandwiching said second active plate, said first and second active plates confronting a restricted region into which said oxygen-containing gas is introduced;

current supply means, connected to said oxygen pump element, for supplying a drive current across the electrodes of said oxygen pump element so that a sensor output signal whose level is proportional to an oxygen concentration of said oxygen-containing gas is generated at said sensor cell element; and

delay control means, connected to said current supply, means for gradually increasing said drive current to said oxygen pump element.

4,698,210

SAMPLE CUP APPARATUS FOR USE IN X-RAY SPECTROSCOPY EMPLOYING SELECTIVELY OPERATED VENTING MEANS

Michael C. Solazzi, Eastchester, N.Y., assignor to Chemplex Industries, Inc., Eastchester, N.Y.

Filed Nov. 30, 1984, Ser. No. 676,833

Int. Cl.[4] G01N *23/10, 23/20, 23/223, 21/51*

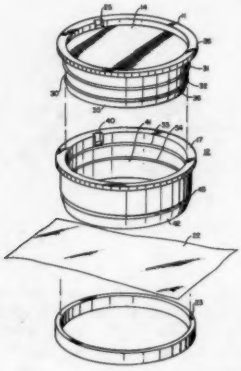
U.S. Cl. 422—102 **10 Claims**

1. A selectively ventable sample cup for retaining a specimen to be subjected to spectrochemical analysis, comprising,

a cell body of a cylindrical configuration having an opened top and an opened bottom, and having a first peripheral flange about said opened top with an aperture means on an inner periphery of said first flange in communication with an internal hollow defined by said cell body,

a rotatable cap member positioned over said opened top of said cell body, said rotatable cap member having a closed top surface and a peripherally disposed sidewall, wherein said top surface is surrounded by a second peripheral

flange extending upwardly and outwardly therefrom, wherein said peripherally disposed sidewall is insertable within said opened top of said cell body, said second extending peripheral flange limiting the depth of penetration of said peripheral sidewall into said cell body, said closed top surface and said second upwardly and outwardly extending peripheral flange defining a reservoir for collecting liquid, said second flange having aperture means, with said second flange of said cap member sitting



on said first flange of said cell body when said peripherally disposed sidewall is inserted within said open top to enable said aperture means of said first and said second flanges to communicate when said cap member is in a first rotatable position to form an interior venting passageway from the internal hollow of said cell to said reservoir and to close said passageway in a second rotatable position,

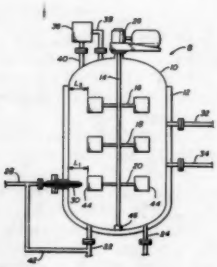
means covering said opened bottom of said cell body when a specimen is contained within said hollow.

4,698,211

CATALYST INJECTION FOR ZIEGLER POLYMERIZATION

William R. Storey, Humble; William R. Wheat, Houston; Stuart B. Smith, Crosby, all of Tex., and Milind B. Ajinkya, Stanhope, N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Aug. 19, 1985, Ser. No. 766,999
Int. Cl.[4] B01J *14/00*
U.S. Cl. 422—135 **12 Claims**



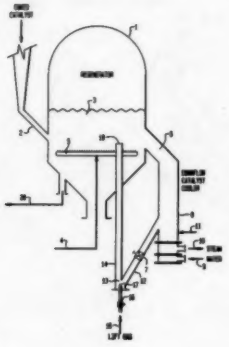
1. In a reactor for polymerization of alpha-olefins in liquid phase comprising a vessel having inlet means for reactants and cocatalysts, outlet means for polymer slurry, having one or more impeller means arrayed along a vertical shaft centrally positioned in said vessel and rotatable therein by power means wherein the improvement is the positioning of a solid cocatalyst slurry inlet means on substantially the same horizontal plane as the bottom impeller means and extending into said vessel toward said impeller for a distance of from about 30 to 80% of the distance from the vessel wall to the distal end of the impeller means.

4,698,212

PROCESS AND APPARATUS FOR COOLING DURING REGENERATION OF FLUID CRACKING CATALYST

Paul W. Walters, Ashland; H. Anthony Raiche, Russell, both of Ky.; Ronald L. Harness, and Genaro M. Quodala, both of Huntington, W. Va., assignors to Ashland Oil, Inc., Ashland, Ky.

Division of Ser. No. 747,461, Jun. 21, 1985, Pat. No. 4,614,726.
This application Dec. 16, 1985, Ser. No. 809,560
Int. Cl.[4] B01J *8/18*
U.S. Cl. 422—144 **6 Claims**



1. In an apparatus for the regeneration of coke contaminated fluid cracking catalyst, the combination comprising:

A. an elongated upflow regeneration vessel, containing a dense bed of catalyst and a regeneration gas grid located within said bed;

B. a vertical heat exchanger mounted to the lower side of said vessel adapted to receive hot catalyst directly from the regeneration vessel and adapted to cool the hot catalyst as it passes downwardly through the exchanger

C. a Y junction positioned below the lower end of the heat exchanger;

D. first conduit means for passing cool catalyst downwardly to said Y junction;

E. second conduit means for passing cool catalyst from said Y junction upwardly into the dense bed of catalyst in the regeneration vessel, and

F. regeneration gas supply means, separate from said second conduit means, for supplying regeneration gas to said gas grid;

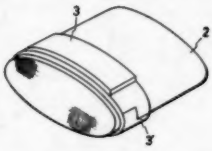
G. lift gas supply means, separate from said regeneration gas supply means, for introducing lift gas into said second conduit means so as to lift the cool catalyst up through said second conduit means to said regenerator.

4,698,213

EXHAUST GAS PURIFIER WITH RESISTANT CIRCUMFERENTIAL SEALING MEMBER BETWEEN MONOLITH CATALYST AND CASING

Kozi Shimozi, Okazaki, and Hitoshi Teshima, Aichi, both of Japan, assignors to Toyota Joshida Kabushiki Kaisha, Aichi, Japan

Filed Mar. 31, 1983, Ser. No. 480,813
Claims priority, application Japan, Sep. 7, 1983, 57-135590[U]
Int. Cl.[4] B01J *8/00*; F01N *3/28*
U.S. Cl. 422—179 **9 Claims**



1. A monolithic catalytic exhaust gas purifier for an internal combustion engine, the purifier including a cylindrical sheet metal casing having a longitudinal axis, a first end with an inlet, and a second end opposite the first end with an outlet for respectively introducing exhaust gas into and discharging exhaust gas from the casing, said casing having a flattened cross section transverse to said axis with a minimum cross dimension in one direction and a maximum cross dimension perpendicular to the one direction, a monolithic catalyst housed within the casing, and a supporting and sealing member of heat-insulating resilient material compressed within an annular space defined by the flattened cylindrical wall of the casing and an outer peripheral surface of the catalyst facing the flattened cylindrical wall of the casing, the supporting and sealing member existing completely around said outer peripheral circumference of the catalyst, wherein the improvement comprises:

said monolithic catalyst being cylindrical and having a flattened cross section transverse to the longitudinal axis of the casing and having a minimum cross dimension and a maximum cross dimension; and

said supporting and sealing member assembled completely around the catalyst having portions disposed at the minimum cross dimension of the catalyst and having a total thickness greater than the average thickness of the supporting and sealing member and portions disposed at the maximum cross dimension of the catalyst having a total thickness less than the average thickness of the supporting and sealing member, the thicker portions of the supporting and sealing member being disposed at the minimum cross dimension portion of the casing and the thinner portions being disposed at the maximum cross dimension portion of the casing such that the supporting and sealing member will maintain a bulk density balance over all portions of the member around the outer peripheral circumference of said catalyst when the exhaust gas purifier is heated to its normal operating temperature.

4,698,214

METHOD AND COMBUSTION REACTOR FOR CONVERTING URANIUM HEXAFLUORIDE GAS TO AN OXIDE OF URANIUM

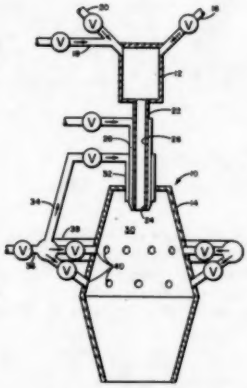
David G. Linz; Robert K. Grier, Jr.; Jennifer A. Wetzel; Abdul G. Dada and John D. Connolly all of Wilmington, N.C., assignors to General Electric Company, San Jose, Calif.

Filed Aug. 12, 1985, Ser. No. 764,394
Int. Cl.[4] C01G *43/01, 43/025*
U.S. Cl. 423—260 **24 Claims**

1. A method for converting uranium hexafluoride to uranium oxide in a gaseous reaction medium, comprising the steps of:

(a) supplying gases individually comprising uranium hexafluoride, oxygen and hydrogen, and mixing same;

(b) feeding the mixed gases as a combined jet stream into a reactor zone wherein the uranium hexafluoride is converted to an oxide of uranium;



(c) supplying hydrogen gas separately in an annular flow pattern surrounding and generally parallel to the jet stream of the mixed gases into the reaction zone; and

(d) supplying a quenching gas separately intermediate the reaction zone where the mixed gases convert uranium hexafluoride to an oxide of uranium.

4,698,215

STABILIZED RED PHOSPHORUS FOR USE AS FLAME-RETARDANT, IN PARTICULAR FOR COMPOSITIONS ON THE BASIS OF POLYMERS

Giancarlo Albanesi, Milan, and Gianfranco Rinaldi, Magenta, both of Italy, assignors to Saffa S.p.A., Milan, Italy

Filed Dec. 27, 1985, Ser. No. 813,924
Claims priority, application Italy, Mar. 19, 1985, 19962 A/85
Int. Cl.[4] C01B *25/023*; C09K *21/00*; C08K *9/10*
U.S. Cl. 423—274 **5 Claims**

1. A stabilized pulverulent red phosphorus, comprising; red phosphorus particles; and an oxidation stabilizer enveloping said phosphorus particles in the form of a composite capsule, said capsule being approximately 1 to 12% by weight based upon the amount of said phosphorus particles and having a first layer of aluminum hydroxide adhering onto the surface of said phosphorus particles, the aluminum hydroxide being approximately 0.2 to 4% by weight based upon the amount of said phosphorus particles, and said capsule having a second layer, superimposed onto said first layer, said second layer having a polycondensation resin formed by urea formaldehyde modified with melamine and phenol, said resin being approximately 0.8 to 8% by weight based upon said phosphorus particles.

4,698,216

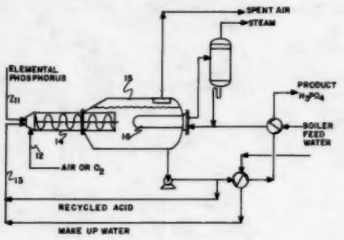
PRODUCTION OF AN AQUEOUS PHOSPHORIC ACID SOLUTION

Manchiu D. Lay, Hastings, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 8, 1986, Ser. No. 894,528
Int. Cl.[4] C01B *25/12*
U.S. Cl. 423—317 **9 Claims**

1. A process for the production of an aqueous phosphoric acid solution which comprises contacting an elemental phosphorus-containing material with an oxygen-containing gas,

while both are in mixed, finely divided form, in a reactor vessel, while the phosphorus-containing material is otherwise protected from direct contact with oxygen in the atmosphere by being blanketed with a protective aqueous layer, whereby reaction of the elemental phosphorus and oxygen occurs in the



liquid phase with absorption by the liquid phase of the resulting P_2O_5 values produced thereby to yield the phosphoric acid solution, and which also comprises removing and recovering the heat generated in the reactor vessel due to the contact of oxygen and the elemental phosphorus in the liquid aqueous layer.

4,698,217

CRYSTALLINE SILICATE ZSM-58 AND PROCESS FOR ITS PREPARATION USING A METHYLTROPINIUM CATION

Ernest W. Valyocsik, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 705,821, Feb. 26, 1985, abandoned. This application May 9, 1986, Ser. No. 861,789

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—328 C **17 Claims**

1. A synthetic porous crystalline material being characterized by (1) an X-ray diffraction pattern exhibiting values substantially as set forth in TABLE 1 of the specification and (2) a composition comprising silica and alumina in the relationship

$$(0.1\text{–}2)Al_2O_3:(100)SiO_2.$$

2. The crystalline material of claim 1 in the as-synthesized form having a composition, on an anhydrous basis and in terms of moles of oxides per 100 moles of silica, expressed by the formula:

$$(0.1\text{–}2.0)R_2O:(0.02\text{–}1.0)M_{2/n}O:(0.1\text{–}2)Al_2O_3:(100\text{–})SiO_2$$

wherein M is an alkali or alkaline earth metal cation, n is the valence of M, and R is a methyltropinium cation.

4,698,218

PROCESS AND THE APPARATUS FOR THE PRODUCTION OF SILICON HYDRIDES

Dominique Belot, Le Chesnay; Jean-Yves Rade, both of Le Chesnay; Jean-Francois Piffard, Suresnes; Christian Larquet, Guyancourt, and Philippe Cornut, La Celle-Saint-Cloud, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

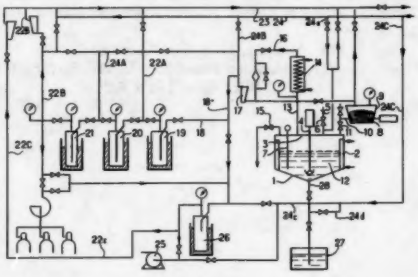
Filed Dec. 19, 1984, Ser. No. 683,475

Claims priority, application France, Dec. 19, 1983, 83 20267

Int. Cl.[4] C01B *33/04*

U.S. Cl. 423—347 **14 Claims**

1. Process for producing silicon hydride by acid hydrolysis of an industrial ternary alloy of the formula $M^1_xM^2_ySi_z$ in which M^1 is aluminum or magnesium, M_2 is calcium, and wherein each of x, y, and z is at least 10% and containing at least 20% alloyed silicon, comprising: reacting said alloy with a dilute hydrofluoric, hydrochloric or orthophosphoric acid, in a concentration between 2N and 6N, by adding into the acid the ternary alloy in the form of a fine powder of a granulometry at least as small as 0.4 mm, the reaction being conducted at a temperature of at least 50° C., the ternary metal powder being introduced to the acid at a rate such that the reaction temperature does not exceed 90° C.



4,698,219

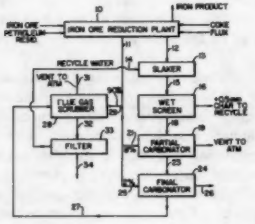
TREATMENT OF WASTE FROM IRON ORE REDUCTION

Utah Tsao, Jersey City, and Joseph Kettell, Fair Lawn, both of N.J., assignors to Lummus Crest, Inc., Bloomfield, N.J.

Filed Oct. 11, 1983, Ser. No. 540,376

Int. Cl.[4] C01B *31/24, 17/16;* **C01F** *11/18;* **C21B** *17/04*

U.S. Cl. 423—563 **6 Claims**



1. In a process for directly reducing iron ore to iron wherein there is recovered a flue gas comprising carbon dioxide and sulfur dioxide and solids comprising calcium sulfide and calcium oxide, the improvement for treating said solids comprising:

forming an aqueous slurry of said solids;

reacting the aqueous slurry of said solids in a first carbonation zone, with sulfur dioxide and carbon dioxide in a first portion of said flue gas at a pH of at least 9.0 and at which calcium sulfide is prevented from reacting with the flue gas to release hydrogen sufide from the carbonation zone zone;

recovering aqeuous slurry and a remaining gas from the first carbonation zone;

reacting aqueous slurry recovered from the first carbonation zone in a second carbonation zone with carbon dioxide and sulfur dioxide in a second portion of said flue gas without use of said remaining gas at a pH below 8.0 and at which the gas reacts with calcium sulfide to release hydrogen sulfide from the second carbonation zone, said second portion being smaller than the first portion; and

recovering solids from the second carbonation zone which are free of calcium oxide and calcium sulfide.

4,698,220

PARTITIONED REDUCTION PROCESS FOR FERROMAGNETIC CHROMIUM DIOXIDE

Terry G. Crandall, Wilmington, Del., and Horng-Yih Chen, Chadds Ford, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 845,733, Mar. 28, 1986, abandoned. This application Jan. 20, 1987, Ser. No. 2,311

Int. Cl.[4] C01G *37/027*

U.S. Cl. 423—607 **14 Claims**

1. A process for producing ferromagnetic chromium dioxide comprising:

(a) adding chromium trioxide in water to form a slurry containing approximately 2.5 to 5 parts of chromium trioxide per part of water by weight;

(b) adding to said slurry approximately 0.2 to 0.5 equivalents of an organic reducing agent per equivalent of chromium trioxide, said organic reducin agent, having a carbon backbone of at least C6 and maintaining the temperature below approximately 90° C. while agitating the slurry until 30% to 80% of the organic reducing agent reacts with and reduces Cr^{+6} in the chromium trioxide to form a paste containing mixed intermediate chromium valences that are soluble therein;

(c) heating the paste to a temperature above approximately 110° C. but below a temperature at which chromium dioxide begins to form, at which temperature the remaining reducing agent from step (b) reacts with Cr^{+6} in the chromium trioxide and the mixed intermediate valences produced in (b): and

(d) further heating the paste to a temperature of approximately 300° C. to 400° C. under a pressure of approximately 300 to 400 atmospheres to form ferromagnetic chromium dioxide.

11. A process for producing ferromagnetic chromium dioxide comprising:

(a) adding chromium trioxide in water to form a slurry containing approximately 2.5 to 5 parts of chromium trioxide per part of water by weight:

(b) adding to said slurry approximately 0.2 to 0.5 equivalents of organic reducing agent per equivalent of chromium trioxide, of which reducing agent

(i) up to 40% is a C_2 to C_5 primary organic acid, and

(ii) the remainder has a carbon backbone of at least C_6 and maintaining the temperature below approximately 90° C. while agitating the slurry until 30% to 80% of the organic reducing agent reacts with and reduces Cr^{+6} in the chromium trioxide to form a paste containing mixed intermediate chromium valences that are soluble therein;

(c) heating the paste to a temperature above approximately 110° C. but below a temperature at which chromium dioxide begins to form, at which temperature the remaining reducing agent from step (b) reacts with Cr^{+6} in the chromium trioxide and the mixed intermediate valences produced in (b); and

(d) further heating the paste to a temperature of approximately 300° C. to 400° C. under a pressure of approximately 300 to 400 atmospheres to form ferromagnetic chromium dioxide.

4,698,221

VACCINES CONTAINING FAT SOLUBLE VITAMINS, ZINC COMPOUNDS AND SELENIUM COMPOUNDS

Otto C. Straub, Tübingen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 547,829, Nov. 2, 1983, abandoned. This application Mar. 2, 1984, Ser. No. 585,680

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1982, 3241113

Int. Cl.[4] A61K *39/12, 39/00, 39/02*

U.S. Cl. 424—89 **20 Claims**

1. A vaccine composition containing an immunologically effective amount of an antigen, an immunologically effective amount of at least one fat soluble vitamin and immunologically effective amounts of at least one physiologically acceptable zinc compound and at least one physiologically acceptable selenium compound.

5. A vaccine composition according to claim 1 which further comprises levamisol and/or an antiprostaglandin.

7. A vaccine composition according to claim 1, containing (a) 20,000 to 600,000 units of each of the fat soluble vitamins A and D, 100 to 1,000 mg of vitamin E, 100 to 1,000 mg of physiologically acceptable selenium compounds, 50 to 1,000 mg of physiologically acceptable zinc compounds and 20 to 95 parts by weight of an absorption-promoting agent.

9. A vaccine composition according to claim 7 wherein the absorption-promoting agent is a compound selected from the group consisting of alkanols, glycols, aromatic alcohols, trihydric alcohols, carboxylic acid esters, aromatic and aliphatic hydrocarbons, non-spreading oils, water and ketones.

12. A vaccine composition according to claim 1 wherein the antigen is selected from the group consisting of IBR/IPV viruses, PI-3 viruses, BBT viruses, adenoviruses, reoviruses, RSV viruses, retroviruses, coroviruses, poxviruses or rotaviruses and bacteria, in activated or inactivated form.

4,698,222

EXTRACTION OF INSECTICIDES FROM PLANTS

Francoise Grinda, Vallauris, and Jean Gueyne, Paris, both of France, assignors to SAPHYR S.A.R.L., France

PCT No. PCT/FR83/00079, § 371 Date Jan. 13, 1984, § 102(e) Date Jan. 13, 1984, PCT Pub. No. WO83/03951, PCT Pub. Date Nov. 24, 1983

PCT Filed Apr. 28, 1983, Ser. No. 576,385

Claims priority, application France, May 14, 1982, 82 08436

Int. Cl.[4] A01N *65/00*

U.S. Cl. 421—195 **17 Claims**

1. A method of extracting a natural insecticidal substance from a plant containing the insecticidal substance selected from the group consisting of *Lonchocarpus Nicou, Lonchocarpus Urucu, Milletia ferruginea, Milletia pachycarpa, Mundulea suberosa, Pachyrhyzus tuberosus, Pachyrhyzus tephrosia, Piscidia erythrina, Herba pireta* and derris which comprises contacting powdered dry parts of the plant with an alkyl or alkenyl ester of a fatty acid, in which the ester moiety contains 1 to 16 carbon atoms and the fatty acid moiety contains 6 to 30 carbon atoms, and thereafter recovering the ester having the natural insecticide substance dissolved therein.

4,698,223

NO-CALORIE, NON-CARIOGENIC CHEWING GUM COMPOSITION

Giorgio Perfetti, and Giuseppe Sozzi, both of Lainate, Italy, assignors to Gum Base Co., S.p.A., Italy

Filed Nov. 15, 1984, Ser. No. 671,839

Claims priority, application Italy, May 29, 1984, 21143 A/84

Int. Cl.[4] A23G *3/30*

U.S. Cl. 426—4 **10 Claims**

1. A non-cariogenic, no-calorie chewing gum composition, including, in percentages by weight, from 92% to 99% of a base gum, up to 3% of flavorings and up to 4% of glycerol, and wherein the base gum is sugarfree and comprises, in percentages by weight:

from 8 to 15% of an elastomer selected from the group consisting of polyisobutylenes and isobutylene-isoprene copolymers,

from 10 to 30% of hydrogenated or partially-hydrogenated animal or vegetable oils,

from 10 to 39% of inert mineral fillers,

from 8 to 25% of polyvinyl acetate with a degree of polymerization of from 100 to 400,

from 4 to 9% of fatty acid mono- and di-glycerides,

from 15 to 25% of resins,

from 2 to 6% of natural gum,

from 4 to 12% of wax and

up to 0.05% of antioxidants.

4,698,224

PRODUCTION OF ALCOHOLIC BEVERAGES

Koichi Nakanishi; Toshio Onaka, and Takashi Inoue, all of Takasaki, Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1985, Ser. No. 719,494

Claims priority, application Japan, Apr. 10, 1984, 59-71585; Aug. 31, 1984, 59-182301; Sep. 14, 1984, 59-193378

Int. Cl.[4] C12C *11/00*

U.S. Cl. 426—11 14 Claims

1. A process for producing alcoholic beverages, comprising subjecting a starting brew liquor to a first fermentation under aerobic conditions, in a first fermentation zone, during which substantial proliferation of a yeast takes place, and subsequently to a second fermentation, in a second fermentation zone, during which no substantial proliferation of a yeast takes place in the substantial absence of the yeast employed in the first fermentation entrained thereto, said first fermentation being practiced in the presence of a yeast at a concentration less than 0.4% for a period of time such that vicinal diketone precursor content in a first fermented liquor product of said first fermentation does not exceed 1 ppm and consumption of α-amino nitrogen reaches a predetermined level, and said second fermentation being practiced in the presence of an immobilized yeast at a concentration not less than 0.4% for a period of time such that consumption of carbon reaches a predetermined level, the above % concentration being based on dry yeast cell weight per volume of starting brew liquor (w/v in g/ml).

4,698,225

GRANULAR BINDING AGENT FOR PELLETS

David G. Morrison, 3150 Glen Oaks Ave., White Bear Lake, Minn. 55110

Filed Apr. 15, 1985, Ser. No. 723,620

Int. Cl.[4] A23K *1/20*

U.S. Cl. 426—96 3 Claims

1. A granular binding agent for use with feed pellets comprising:

(a) a granular solid reed sedge peat substrate having a particle size ranging from between about 10 mesh and 50 mesh, and being coated with a film of water soluble lignin sulfonate, said reed sedge peat comprising between about 40 percent and 85 percent by weight of said binding agent; and

(b) balance of from 15 percent to 60 percent by weight comprising a water soluble lignin sulfonate selected from the group consisting of sodium, ammonium, calcium and magnesium lignin sulfonates as the dried film coating said particles; and

(c) said lignin sulfonate film coating being in the form of a relatively thin layer on the surface of said granular peat solid, and maintained thereon by surface absorption bonds, whereby a coated granular binding agent for pelletized feed is provided.

4,698,226

APPLE LABELING PROCESS

David W. Guthrie, P.O. Box V, Tonasket, Wash. 98855

Continuation-in-part of Ser. No. 630,502, Jul. 13, 1984, abandoned. This application Jul. 5, 1985, Ser. No. 751,301

Int. Cl.[4] A23L *1/212*

U.S. Cl. 426—248 17 Claims

1. A method of incorporating a design into the skin or surface of a fruit or vegetable whose skin or surface is photochemically reactive, comprising:

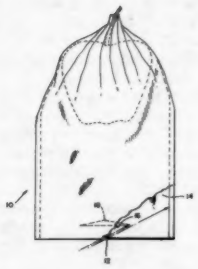
enclosing the fruit or vegetable while it is still attached to the parent plant or tree in at least one bag having a reflective outer surface and a non-reflective inner surface, said bag having an open proximal end adapted to fit over and substantially surround said fruit, a distal end having at least one aperture communicating with the interior volume of said bag to allow the drainage of fluids therethrough to the exterior of said bag, and a light barrier located at the distal end inward of said aperture, the light barrier positioned to block light from entering through said aperture into the interior volume of the bag, said bag applied before the skin of said fruit or vegetable begins to develop its natural color;

harvesting the fruit or vegetable and transferring said fruit or vegetable to a substantially light-exclusive environment;

removing the bag from said harvested fruit or vegetable;

applying a label or symbol to the skin of the fruit or vegetable such that said label or symbol adheres thereto; and

exposing said fruit or vegetable with the label or symbol thereon to an artificial fluorescent light source such that the exposed skin of said fruit or vegetable develops its natural color.



17. A method of producing consistently high quality apples, comprising:

enclosing the apple while it is still attached to the parent plant or tree in at least one bag having a reflective outer surface and a non-reflective inner surface, said bag having an open proximal end adapted to fit over and substantially surround said fruit, a distal end having at least one aperture communicating with the interior volume of said bag to allow the drainage of fluids therethrough to the exterior of said bag, and a light barrier located at the distal end inward of said aperture, the light barrier positioned to block light from entering through said aperture into the interior volume of the bag;

harvesting the apple and transferring it to a substantially light-exclusive environment;

removing the bag from said harvested apple; and

exposing the apple to an artificial fluorescent light source such that the apple develops its natural color.

4,698,227

PLATE PUNCHING DEVICE WITH SEPARATE CHAMFERING TOOL MOUNTED TO INTERNAL PRESSURE PLATE

George Weik, Neu-Ulm, Fed. Rep. of Germany, assignor to Lingl Corporation, Paris, Tenn.

Filed Oct. 9, 1986, Ser. No. 917,156

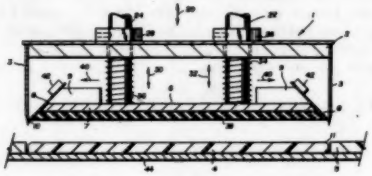
Claims priority, application Fed. Rep. of Germany, Oct. 11, 1985, 3536396

Int. Cl.[4] B29C *59/02*

U.S. Cl. 425—296 10 Claims

1. A punching device for use in the production of ceramic plates, including a punching tool with punching knives and a press plate arranged to be vertically movable within the punching knives which press plate, upon punching of an uncured ceramic plate material, can be pressed into a strand of the uncured plate material, said punching device comprising a chamfering tool mounted on the sides of the press plate (7) facing the punching knives (3), said chamfering tool compris-

ing leaf-shaped chamfering knives (10), which chamfering knives butt flush against the punching knives (3) at a predetermined chamfer angle and which knives are adjustably mounted on the press plate (7).



4,698,228

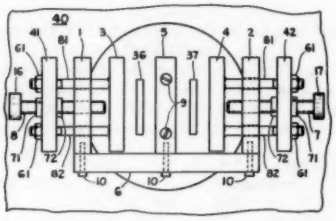
PROCESS FOR EXTRUDING DOUGH AS USED IN PRODUCING CRISP BREADS

Robert Straka, Pequannock; Edgar Ross, Wayne, and Fred Vanderveer, Mahwah, all of N.J., assignors to Nabisco Brands, Parsippany, N.J.

Division of Ser. No. 594,159, Mar. 29, 1984, Pat. No. 4,659,303. This application Nov. 15, 1985, Ser. No. 798,419

Int. Cl.[4] A21D *13/00*

U.S. Cl. 426—446 **7 Claims**



1. A process for extruding an expansible cooked dough, which process comprises passing the dough through a die head having walls defining an elongate die slot having its long edges disposed substantially vertically, thereby causing the dough to undergo vaporization of water and expansion of steam therein, and hence expansion of the dough, as the dough leaves the die slot, the die slot having two guide surfaces disposed on either side of the die slot and extending substantially vertically and substantially parallel to the length of the die slot, whereby contact between the expanded dough and the two guide surfaces enables uniform escape of water vapor from the two substantially vertical surfaces of the extruded dough, thereby producing a more uniformly textured cellular product.

4,698,229

METHOD FOR COMPRESSING PITTED PRUNES

Robert E. Gunnerson, Manteca, Calif., assignor to Sunsweet Growers, Inc., Stockton, Calif.

Division of Ser. No. 713,062, Mar. 18, 1985, Pat. No. 4,632,027, which is a continuation-in-part of Ser. No. 540,572, Oct. 7, 1983, abandoned. This application Sep. 16, 1986, Ser. No. 907,777

Int. Cl.[4] A23P *1/00*

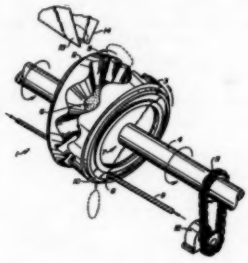
U.S. Cl. 426—512 **2 Claims**

1. A process for the compression of a pitted prune along its longest dimension, comprising:

(a) placing said pitted prune on a flexible membrane mounted to a pair of disks, the opposing surfaces of said disks forming at least one pair of opposing recesses to accommodate the pitted prune and said membrane spanning the space between the opposing recesses to define a pocket opening toward the rims of said disks, said disks being arranged in a substantially vertical V-shaped configuration and said pitted prune being oriented with its longest dimension parallel to the line defined by the centers of said disks,

(b) rotating said disks about their centers at the same rate and in the same direction while maintaining said substantially vertical V-shaped configuration to compress said pitted prune therebetween while flexing said flexible membrane to remain in conformance with the contour of said pitted prune as it is compressed, thereby maintaining the orientation of said pitted prune, and

(c) recovering said compressed pitted prune from said flexible membrane.



4,698,230

POTATO FLAVOR ENHANCING COMPOSITION AND METHOD OF USE

Miles J. Willard, 949 E. 17th St., Idaho Falls, Id. 83402

Continuation-in-part of Ser. No. 851,894, Apr. 9, 1986, abandoned, which is a continuation of Ser. No. 602,738, Apr. 23, 1984, abandoned. This application Aug. 25, 1986, Ser. No. 899,977

Int. Cl.[4] A23L *1/22, 1/216*

U.S. Cl. 426—533 **59 Claims**

1. A potato flavor enhancing composition comprising a sugar component, an acidic component provided by at least one acid naturally present in a potato, a metallic flavor component provided by at least one salt of a metal naturally present in a potato, and a bitter flavor component provided by potato solids in dry particulate form which have been heated in air at a sufficiently high temperature for a sufficient length of time to cause browning of the potato solids to the extent that a bitter flavor component is produced by the heated dry particulate potato solids; and in which the sugar, acidic, metallic, and bitter flavor components are combined in relative proportions in the flavor enhancing composition such that the resulting composition provides a composite flavor profile that resembles a fresh potato flavor without the flavor of any one of said flavor components being dominant, and with the flavor of each component being noticeable when the resulting flavor enhancing composition is used as a flavoring agent in a potato-based composition.

4,698,231
SWEETENING WITH L-AMINODICARBOXYLIC ACID AMIDES

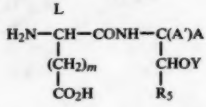
Ronald E. Barnett, Suffern; Paul R. Zanno, Nanuet, and Glenn M. Roy, Garnerville, all of N.Y., assignors to General Food Corporation, White Plains, N.Y.

Continuation of Ser. No. 719,664, Apr. 4, 1985, Pat. No. 4,622,418, which is a continuation-in-part of Ser. No. 686,570, Dec. 27, 1984, Pat. No. 4,622,417. This application Jun. 11, 1986, Ser. No. 873,235

Int. Cl.[4] A23L *1/236*

U.S. Cl. 426—548 **5 Claims**

1. A composition comprising an edible composition and a sweetening effective amount of a compound represented by the formula:



wherein:

A is hydrogen, alkyl containing 1–3 carbon atoms, hydroxyalkyl containing 1–3 carbon atoms or alkoxymethyl wherein the alkoxy contains 1–3 carbon atoms;

A′ is hydrogen or alkyl containing 1–3 carbon atoms; alternatively

A+A′ taken together with the carbon atom to which they are attached form cycloalkyl containg 3–4 carbon atoms;

Y is $-(CHR_2)_n-R_1$, or $-CHR_3R_4$;

R_1 is cycloalkyl, cycloalkenyl, lower alkyl substituted cycloalkyl or cycloalkenyl, bicycloalkyl, bicycloalkenyl or tricycloalkyl containing up to 10 ring carbon atoms and up to a total of 12 carbon atoms;

R_2 and R_5 are each H or alkyl containing 1–4 carbon atoms;

R_3 and R_4 are each cycloalkyl containing 3–4 ring carbon atoms;

n=0 or 1; and

m=0 or 1;

and food-acceptable salts thereof.

4,698,232
SOFT-TEXTURED CONFECTIONER COMPOSITION CONTAINING FIBER

Shan-Shan Sheu, Parsippany; Robert K. Yang, Randolph, and Vincent Corsello, Cedar Knolls, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jun. 17, 1986, Ser. No. 875,429

Int. Cl.[4] A23L *1/308, 1/307;* **A23G** *3/00*

U.S. Cl. 426—572 **18 Claims**

1. A fiber-containing confectionery composition having a soft, non-fibrous texture comprising:

(a) a pre-treated fiber composite present in amounts of about 25 to about 45% by weight of the total composition, said composite comprising dietary fiber powder coated with a lubricant material selected from the group consisting of fats and glycerin;

(b) a foamed matrix portion having a density of about 0.3 to about 0.5 g/cm^3 comprising gelatin, gum arabic and non-sucrose liquid sweetener capable of providing bulk and structure to the foamed matrix; and

(c) an amorphous matrix portion present in amounts of about 40 to about 60% by weight of the total composition, comprising a non-sucrose-containing corn syrup having a solids content of about 92 to 96% by weight of the syrup.

4,698,233
PRODUCTION OF ALUMINUM MATERIAL HAVING AN ALUMINUM NITRIDE LAYER

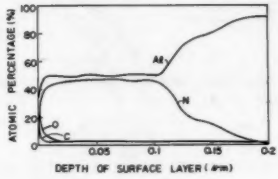
Shigeo Ohira, Ihara, and Masaya Iwaki, Wako City, both of Japan, assignors to Nippon Light Metal Company Limited, Tokyo and Rikagaku Kenkyusho, Wako City, both of, Japan

Filed Jun. 10, 1986, Ser. No. 872,278

Claims priority, application Japan, Jun. 24, 1985, 60-137625

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—38 **6 Claims**



1. A process for producing an aluminum material having an aluminum nitride layer on the surface thereof which comprises implanting the surface of an aluminum substrate with nitrogen ions while maintaining a nitrogen atmosphere under reduced pressure in the range of about 10^{-7} to 10^{-5} Torr in the vicinity of the surface of the aluminum substrate.

4,698,234
VAPOR DEPOSITION OF SEMICONDUCTOR MATERIAL

Stanford R. Ovshinsky, Bloomfield Hills; Subhendu Guha, Clawson; Prem Nath, Rochester; Chi C. Yang, Troy; Jeffrey Fournier, St. Clair Shores, and James Kulman, Detroit, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Division of Ser. No. 718,661, Apr. 1, 1985, Pat. No. 4,637,895. This application Oct. 17, 1986, Ser. No. 897,449

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—39 **34 Claims**

	H_2 GeH_4 SiH_4 (R_2/R_1)	H_2 GeH_4 Si_2H_6	H_2 SiF_4 GeH_4 SiH_4 (R_2/R_1)	H_2 SiF_4 GeH_4 Si_2H_6
σ_{ph} (ohm cm)$^{-1}$	3-8×10^{-6} (1-2×10^{-6})	3-8×10^{-6}	3-6×10^{-6} (1-2×10^{-6})	2-3×10^{-6}
σ_D (ohm cm)$^{-1}$	1-5×10^{-9} (0-3×10^{-9})	1-8×10^{-9}	1-3×10^{-9} (0-3×10^{-9})	1-9×10^{-9}
E_g (ev)	1.5	1.5	1.5	1.5
E_{σ} (ev)	.74 (.63)	.69	.74 (.63)	.64
RELATIVE SUB BAND GAP ABSORPTION AT 1.1 eV	10 - 20 (10 - 20)	10 - 20	10 - 20 (10 - 20)	2 - 4
DEPOSITION RATE Å / sec	1 - 2	3 - 5	1 - 2	3 - 5
PHOTODEGRADATION AFTER 16 HOURS EXPOSURE TO AM-1	(-24%)	—	(-12%)	-5%

1. A method of fabricating a narrow band gap semiconductor alloy material by the glow discharge decomposition of a process gas mixture, said method including the steps of:

providing a vacuumized deposition chamber;

supporting a substrate in said chamber;

introducing a process gas mixture into said chamber, said gas mixture including a silicon-containing compound and a germanium-containing compound, which compounds decompose and deposit at substantially similar rates when subjected to electromagnetic energy; and

energizing said gas mixture with electromagnetic energy to effect the decomposition thereof, whereby a narrow band gap semiconductor alloy is uniformly deposited upon said substrate.

4,698,235

SITING A FILM ONTO A SUBSTRATE INCLUDING ELECTRON-BEAM EVAPORATION

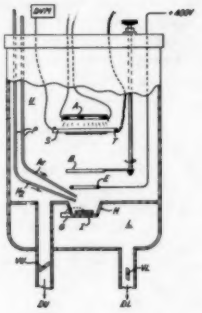
Joseph C. Anderson, London, England, assignor to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 531,724, Sep. 13, 1983, abandoned. This application Sep. 22, 1983, Ser. No. 534,866

Claims priority, application United Kingdom, Sep. 29, 1982, 8227776

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—42 **6 Claims**



1. A process for depositing a film onto a substrate, comprising evaporating under reduced pressure at least one element which is to be a constituent of the film by an electron beam directed onto the element, and heating the substrate, the process being performed in an atmosphere containing hydrogen, the hydrogen being ionised by electrons emitted thermally from the element, the electrons being collected by applying an electric field and wherein each element is chosen such as to form a compound with hydrogen in the ionised gas, such that on reaching the heated substrate a film of a partially hydrogenated element is formed, the crystallographic structure of the film being substantially free of electrically active defects compared with a nonhydrogenated evaporated film, in which process the substrate is electrically biased by a radio frequency voltage to a net negative potential with respect to earth.

4,698,236

AUGMENTED CARBONACEOUS SUBSTRATE ALTERATION

Edwin M. Kellogg, Lexington; John M. Dobbs, South Hamilton; Gregory J. Dunn, Gloucester, all of Mass.; Henry C. Kaufmann, Danville, N.H., and William Thompson, Rockport, Mass., assignors to Ion Beam Systems, Inc., Beverly, Mass.

Continuation-in-part of Ser. No. 665,251, Oct. 26, 1984, abandoned. This application Jan. 2, 1986, Ser. No. 815,824

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—43.1 **35 Claims**

1. A method of accurately altering a precisely located site on a substrate, said method comprising

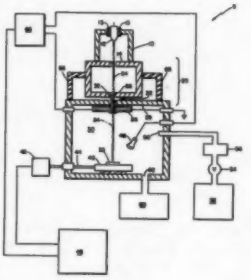
(a) providing a vacuum chamber,

(b) providing an energy beam,

(c) providing a source of a hydrocarbon and a conduit extending between said source and said chamber, said hydrocarbon being capable of being adsorbed on said substrate and of interacting with said energy beam to alter said substrate,

(d) positioning said substrate in said chamber to be exposed to hydrocarbon delivered by said conduit,

(e) introducing into said conduit a carrier having a vapor pressure above the vapor pressure of said hydrocarbon, said carrier being in vapor form under conditions existing in said conduit and having a bulk velocity that transports said hydrocarbon by molecular collisions into said chamber, said hydrocarbon being adsorbed on the surface of said substrate, free carrier molecules being drawn off sufficiently rapidly to maintain low pressure in said chamber, and,



(e) while maintaining said low chamber pressure, directing said energy beam to said site in the presence of said absorbed hydrocarbon, in a manner to convert said hydrocarbon to a coherent carbonaceous deposit of predetermined desired form, adherent to said substrate at said site in order to render said site opaque.

4,698,237

METAL SURFACE HARDENING BY CARBIDE FORMATION

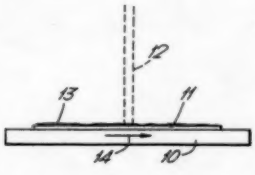
Robert M. Macintyre, Skipton, England, assignor to Rolls-Royce plc, London, England

Filed Dec. 17, 1985, Ser. No. 810,224

Claims priority, application United Kingdom, Jan. 4, 1985, 8500196

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—53.1 **11 Claims**



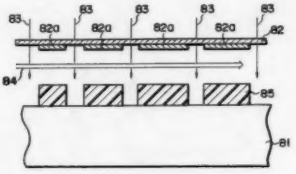
1. A method of surface hardening a metal surface comprising locally melting the metal surface with a beam of high energy radiation in an inert atmosphere or vacuum and in the presence of elemental carbon for sufficient time for said metal and carbon to react to produce a carbide which, on subsequent resolidification, defines a dendritic carbide structure within said metal adjacent the surface thereof.

4,698,238

PATTERN-FORMING METHOD

Nobuo Hayasaka; Haruo Okano, and Yasuhiro Horiike, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 5, 1986, Ser. No. 826,379
Claims priority, application Japan, Feb. 14, 1985, 60-25229
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—53.1 11 Claims



1. A pattern-forming method, comprising:

(a) providing a reaction field in which a photo-induced reaction occurs when a substrate is irradiated with light under an atmosphere of a deposit-forming gas which forms a polymeric material upon irradiation with light so as to form a pattern on said substrate;

(b) setting, in said reaction field, conditions for establishing a nonlinear relationship between the intensity of the light and the rate of the photo-induced reaction; and

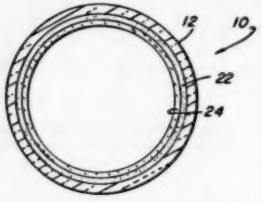
(c) selectively irradiating the substrate with light in said reaction field under said conditions to polymerize said deposit-forming gas and thus selectively depositing said polymeric material on that portion of said substrate which is not irradiated with the light.

4,698,239

FLUORESCENT LAMPS HAVING IMPROVED LAMP SPECTRAL OUTPUT AND MAINTENANCE AND METHOD OF MAKING SAME

John M. Flaherty, Danvers, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Division of Ser. No. 671,133, Nov. 13, 1984, Pat. No. 4,633,133.
This application Sep. 29, 1986, Ser. No. 912,303
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—67 4 Claims



1. The method of making a fluorescent lamp having improved spectral output and maintenance which comprises the steps of:

coating a tubular glass envelope with a phosphor; and

applying over said phosphor a film consisting of yttrium oxide and at least one activator.

4,698,240

METHOD FOR MOISTUREPROOF COATING OF AN ELECTRICAL PRODUCT

Yusuke Ono; Sachio Ohotoshi, both of Yokohama, and Masaru Yamauchi, Yokosuka, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Feb. 19, 1986, Ser. No. 830,843
Claims priority, application Japan, Feb. 19, 1985, 60-29318
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—58 7 Claims

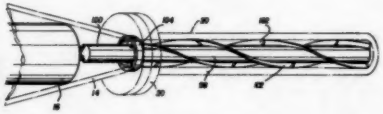
1. A method for moistureproof coating of an electrical product, which comprises applying an organic solution of a polyfluoroalkyl group-containing polymer dissolved in a non-combustible low boiling point organic solvent, to a surface of an electrical product, and drying it by evaporating the low boiling point organic solvent, to form a coating layer of the polyfluoroalkyl group-containing polymer on the surface of the electrical product, wherein said polyfluoroalkyl group-containing polymer is a copolymer of a polymerizable compound having a polyfluoroalkyl group with other polymerizable compound, and the copolymer has a glass transition temperature of not higher than 60° C.

4,698,241

AUTOMATIC DUAL ACTION APPARATUS AND METHOD FOR UNIFORMLY COATING THE INSIDE OF TUBULAR EXTENSIONS

Dalton Roberson, 27 Hollywood Dr., Lampasas, Tex. 76550

Filed Sep. 19, 1985, Ser. No. 777,772
Int. Cl.[4] B05D *1/12, 7/22*
U.S. Cl. 427—183 11 Claims



1. Automatic dual action self contained method for uniformly coating the inside of tubular extensions comprising the steps of:

A. providing a pair of oppositely positioned rotatable cones with the wide end facing outwardly to receive one end of a tubular extension;

B. securedly connecting the narrow end of said rotatable cone, by a connecting means, to a rotating section of uniform circumference within which a radially finned directing means is secured;

C. connecting the opposite end of said rotating section, by means of a rotatable pressure sealing means, with a stationary transfer and mixing means from each of two oppositely positioned fluid beds;

D. engageably attaching two oppositely positioned belt and pulley systems to the rotating sections of two moveable motors;

E. providing two pillow block bearings, one on either side of said belt and pulley systems, for supporting said rotating section whole allowing said rotating section to turn freely;

F. providing a connection in the base of said fluid beds whereby gas, such as air, may be introduced into said fluid beds;

G. creating a gas receiving chamber in said fluid beds formed by the base and side walls of said fluid bed and a gas permeable separator, which prevents coating material contained in said fluid beds from invading said receiving chamber and which allows gas to pass through said permeable separator into said fluid beds containing said coating material;

H. locating an exit port low on a side of said fluid beds so that an exit for said coating material is formed in said fluid

bed just above said permeable separator which is in line with and securedly attached to said stationary transfer and mixing means;

I. attaching a secure connection to said exit port;

J. locating a quick operating valve means just after said exit port connection;

K. attaching a tapered nozzle to the opposite end of said quick operating valve;

L. secureably attaching a coating material and gas mixing chamber to said tapered nozzle near the base of said tapered nozzle so that said tapered nozzle extends into said mixing chamber and wherein said mixing chamber is connected to said rotatable support cone by means of said rotatable pressure sealing means;

M. secureably attaching two oppositely positioned gas introduction means to said gas mixing chamber near the base of said gas mixing chamber where said gas mixing chamber attaches to said tapered nozzle wherein said gas introduction means are positioned so as to cause gas introduction into said gas mixing chamber to rotate and swirl within said mixing chamber and to create a reduced air pressure at said quick operating valve means;

N. secureably attaching one end of a gas chamber to said gas mixing chamber between said tapered nozzle and before said rotatable pressure sealing means and secureably attaching the other end of said gas chamber to a quick operating valve means;

O. secureably attaching two gas introduction means to said gas chamber, positioned so that one gas introduction means directs gas to said gas mixing chamber and one gas introduction means directs gas to said quick operating valve means thereby enabling gas to be introduced into and withdrawn from said gas mixing chamber;

P. providing a measuring means comprised of a geared track along which both said oppositely positioned moveable motors may move and wherein one of said moveable motors is always positioned in a fixed location when receiving said tubular extensions and wherein the second said moveable motor is moved to allow the insertion of the opposite end of said tubular extension into said rotatable cone so that the distance said second moveable motor has traveled on said track from the fixed location of said first said moveable motor can be readily measured;

Q. providing an inner directing tube of said radially finned directing means for directing relatively more of said coating means into the center of said tubular extension;

R. attaching a plurality of outer directing vanes of said radially finned directing means to the outer surface of said inner directing tube which spiral around the outside of said tube in a direction opposite from the rotation of said rotatable cones and said tubular extensions held by said rotatable cones so that relatively less of said coating material is forced to travel farther around the outside of said inner directing tube thereby slowing said coating material down and throwing said coating material outwardly from said inner directing tube;

S. wrapping around and attaching a pair of oppositely positioned vane retention and support rings to said outer directing vanes at each end of said vanes;

T. providing a combination of electrically operated quick operating gas valves and a plurality of gas regulation means whereby gas pressure of a predetermined amount will be released when said quick operating valves are electronically opened;

U. attaching two oppositely positioned gas manifolds for providing a constant supply of gas to said combination gas regulation means and said quick operating valves;

V. connecting said gas manifolds to said gas regulators and connectors said gas regulators to said quick acting valves and connecting said quick acting valves to said connections in the base of said fluid beds, to said oppositely positioned gas introduction means secureably attached to and projected into said gas chamber so that gas of a plurality of pressures and at various times may be introduced to said apparatus;

W. providing a programmable controller means which receives information concerning the length of said tubular extensions from said measuring means and which receives inforamtion from an operator concerning the inside diameter of said tubular extensions and which is connected to said gas regulators and said quick acting valves so that the appropriate amount of gas is released and the quick acting valves are opened the appropriate amount of time so that an appropriate amount of coating material is released first from one fluid bed and then the other;

X. actuating said programmable controller so that a measured amount of coating material is introduced into said pipe and deposited thereon;

Y. attaching a breather-muffler-filter means for filtering and muffling air withdrawn from said dual action apparatus;

Z. slidably attaching at their base two oppositely positioned idler means to a downstream track guidance means along which said idlers may move so that said idlers may be positioned beneath said tubular extension and provide support for said tubular extension while rotating; and

AA. providing a pair of powered roller means located on said downstream track guidance means so that said tubular extension can be rotated during end preparation.

4,698,242

THERMOPLASTIC ELASTIC ADHESIVE CONTAINING POLYETHER BLOCK AMIDES

Catherine E. Salerno, Stirling, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Division of Ser. No. 764,830, Aug. 12, 1985, abandoned. This application Jul. 30, 1986, Ser. No. 890,663

Int. Cl.[4] B05D *5/10, 3/02*

U.S. Cl. 427—208.2 **8 Claims**

1. A method for imparting elongation resistant gathers to portions of a generally non-elastomeric film, or web substrate which comprises contacting a surface of the substrate with a molten band of a self-adhering elastic composition comprising:

(a) from 35 to 75% by weight of a rubbery block copolymer containing a rubbery polyisoprene midblock portion and a plurality of crystaline poly (vinylarene) endblocks wherein the poly(vinylarene) portion constitute from 17 to 75% by weight of the copolymers;

(b) from 10 to 45% by weight of a tackifying resin selected from the group consisting of polyterpene resins having a softening point, as determined by ASTM method E28 58T, of from about 60° to 140° C.; phenolic-modified terpene resins; aliphatic petroleum hydrocarbon resins having a Ball and Ring softening point of from about 60° to 140° C.; and hydrogenated copolymers of styrene and alpha-methyl styrene having a softening point of from 78° to 125° C.;

(c) from 5 to 251% by weight of polyether ester amide; and

(d) from 0.2 to 2% by weight of an antioxidant.

4,698,243

METHOD FOR SIZING AND HYDROLYZING POLYTETRAFLUOROETHYLENE FABRICS, FIBERS, YARNS, OR THREADS

William P. Carl, Angleton, and Jeffrey D. Birdwell, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 20, 1986, Ser. No. 876,493

Int. Cl.[4] B05D *3/02;* **B32B** *7/00, 27/00*

U.S. Cl. 427—341 **25 Claims**

1. A method for coating polytetrafluoroethylene fabrics, fibers, yarns, or threads comprising:

(a) contacting polytetrafluoroethylene fabrics, fibers, yarns, or threads with a sizing composition of an effective amount of a perfluorinated polymer containing sites con-

vertible to ion exchange groups and an effective amount of a treating agent having:

a boiling point less than about 110° C.;

a density of from about 1.55 to about 2.97 grams per cubic centimeter; and

a solubility parameter of from greater than about 7.1 to about 8.2 hildebrands;

(b) removing the treating agent from the sizing composition, thereby depositing the perfluorinated polymer onto the surface of the polytetrafluoroethylene; and

(c) hydrolyzing the perfluorinated polymer to make it water wettable.

4,698,244

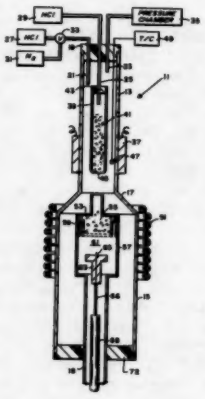
DEPOSITION OF TITANIUM ALUMINIDES

Robert E. Benander, Sylmar, and Robert A. Holzl, LaCanada, both of Calif., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 31, 1985, Ser. No. 793,616

Int. Cl.[4] C23C *16/00*

U.S. Cl. 427—253 **6 Claims**



1. In a method for producing a titanium aluminide coating on a substrate surface, the improvement for varying the atomic ratio of titanium to aluminum in said coating which comprises:

(a) supporting the substrate with the surface to be coated in a reactor chamber,

(b) providing a flow of hydrogen and gaseous aluminum monochloride and a flow of gaseous titanium trichloride at gas temperatures of between about 800° C. and about 1200° C. over the surface of the substrate, by passing a flow of gaseous aluminum trichloride over a titanium surface at a temperature sufficient to cause the gases to react to produce said flow of gaseous titanium trichloride and aluminum monochloride,

(c) providing from no flow to an appreciable flow of hydrogen chloride coincident with the flow of aluminum trichloride in step (b), wherein the flow rate of hydrogen chloride is controlled to provide the atomic ratio between the titanium and aluminum in said coating between about one and three, and

(d) maintaining the substrate surface at a temperature below the temperature of said gases sufficient to cause disproportionation of said gases to deposit titanium and aluminum on said substrate surface.

4,698,245

UNVULCANIZED TREAD STRIP FOR PNEUMATIC VEHICLE TIRES

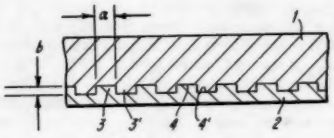
Günter Schallmeier, Neustadt, and Gerhard de Vries, Garbsen, both of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Continuation of Ser. No. 761,602, Aug. 1, 1985, abandoned. This application Jul. 3, 1986, Ser. No. 882,213

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1984, 3428368

Int. Cl.[4] B32B *3/02, 3/30*

U.S. Cl. 428—33 **2 Claims**



1. In a still unvulcanized tread strip, for a pneumatic vehicle tire, having at least two layers to be bonded which are disposed one upon the other in unvulcanized state this still having a plastic behavior including an outer surface of the outer layer which is smooth;

the improvement comprising adjacent ones of said layers respectively being provided with different rubbery mixtures still in an unvulcanized state, said layers thus differing from one another in chemical and physical properties thereof in the still unvulcanized state and the layer to be subjected to wear in the tread strip when subsequently vulcanized being considerably thicker than the adjacent layer in a tread strip uninterrupted from side to side; and

a plurality of corresponding projections and recessed portions in the respective layers which positively intermesh in the still unvulcanized state so as to impart a positive connection thereto and with that receiving a considerable enlargement of bonding surface interengagement which improves adhesion therewith in the still unvulcanized state and accordingly overcomes adhesion weaknesses so that during subsequent vulcanization there is effected a bonding together less susceptible to subsequent separation therebetween;

said projections and said recessed portions having a width in a range of from about 0.5 to 3 mm, said projections and said recessed portions having a depth in a range of from about 0.5 to 2.5 mm; and

said projections being in the form of ribs, said recessed portions being in the form of grooves, said ribs and grooves extending in the longitudinal direction of said tread strip; said projections being in the form of individual projections having an essentially rectangular cross-section, and said recessed portions being in the form of corresponding recesses that intermesh complementary to each other to preclude any separations which are associated with inadequate adhesion.

4,698,246

NOVEL LAMINATES FOR PAPERBOARD CARTONS AND A PROCESS OF FORMING SAID LAMINATES

Charles E. Gibbons; Allan A. Whillock; Robert L. Lanham, and Joe L. Kinsey, Jr., all of Mobile, Ala., assignors to International Paper Company, New York, N.Y.

Filed Mar. 5, 1986, Ser. No. 836,286

Int. Cl.[4] B65D *15/22;* B32B *27/00*

U.S. Cl. 428—35 **22 Claims**

1. A container for liquids containing essential oils and/or flavors, said container constructed from a laminate comprising:

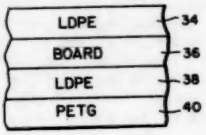
(a) a paperboard substrate;

(b) an outer layer of a heat-sealable low density polyethylene

polymer coated on said outer surface of said paperboard substrate;

(c) an inner layer of a heat-sealable low density polyethylene polymer coated on said inner surface of said paperboard substrate; and

(d) a liquid contact layer of a heat-sealable glycol modified



polyethylene terephthalate which can heat-seal with the outside layer of low density polyethylene of the laminate on conventional equipment at temperatures ranging from 250° F.–500° F. extrusion coated on said outer surface of said inner layer of said polyethylene polymer, acting as a barrier to the transport of oxygen and essential oils/flavors therethrough.

4,698,247

MULTIPLE LAYER SHEET MATERIAL

Lee J. Murray, Appleton, and Suzanne E. Schaefer, Neenah, both of Wis., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 687,202, Dec. 28, 1984. This application Jul. 21, 1986, Ser. No. 887,469

Int. Cl.[4] B32N *5/02*

U.S. Cl. 428—35 **9 Claims**

1. A package comprising a packaging sheet material and a product therein, said product including a substantial fraction of cyanoacrylate, said packaging sheet material comprising:

(a) a first layer of high density polyethylene;

(b) a second layer, the composition of said second layer being chosen from the group consisting of polymers and adhesives; and

(c) a third primer layer of polyethylene imine,

said third layer being between said first and second layers, said first layer being disposed toward the inside of said package, and wherein, when said composition of said second layer is polymeric, said second layer is protective of said primer layer, and wherein, when said composition of said second layer is an adhesive, said second layer has two opposing surfaces and adheres a fourth layer to said sheet structure on the one of said surafaces of said second layer which is opposite said primer layer, all the layers of said sheet material being firmly adhered to each other, said package being configured such that no edge of said sheet material is exposed to said product.

4,698,248

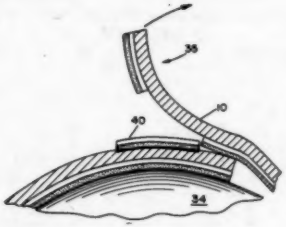
RELEASABLE ADHESIVE SHEET MATERIAL BONDED PRODUCT

Nicholas D. Gallagher; Richard S. Sternasty, and Richard A. James, all of Troy, Ohio, assignors to Kimberly-Clark Corporation, Neenah, Wis.

Division of Ser. No. 750,827, Jul. 1, 1985, Pat. No. 4,632,872, which is a continuation-in-part of Ser. No. 502,793, Jun. 9, 1983, abandoned. This application Jun. 5, 1986, Ser. No. 871,636

Int. Cl.[4] A61F *13/02*

U.S. Cl. 428—41 **9 Claims**



1. In combination, coil, a stack, or a skein and a band surrounding said coil, stack or skein to maintain its condition,

the improvement wherein said band comprises a self-adherent, nondelaminating adhesive sheet material consisting essentially of,

(a) a fibrous base web, having a first side and an opposite side,

(b) a first coating on said first side of said base web forming a substantially continuous coating, and

(c) an adhesive coating on said coated base web covering and in contact with said first coating at all times or located on said opposite side but in either location positioned so as to be in contact with said first coating at least where said adhesive sheet material is placed in overlapping contact with itself, wherein said first coating has a greater affinity for said adhesive than for said base web, whereby when opposite surfaces of said adhesive sheet material are placed in overlapping contact with each other, said coating predominantly adheres to said adhesive, and the surfaces separate upon application of peel force without substantially delaminating said base web.

4,698,249

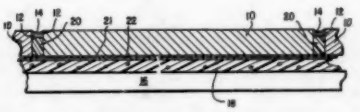
MODULAR-ACCESSIBLE-TILES PROVIDING ACCESSIBILITY TO CONDUCTORS AND PIPING WITH IMPROVED SOUND ISOLATION

John G. Brown, 20205 State Line Rd. Harvard, Ill. 60033

Continuation of Ser. No. 391,760, Jun. 24, 1982, Pat. No. 4,546,024, which is a continuation-in-part of Ser. No. 131,516, Mar. 18, 1980, abandoned. This application Oct. 2, 1985, Ser. No. 783,309

Int. Cl.[4] B32B *3/00;* **E04F** *15/16*

U.S. Cl. 428—44 **20 Claims**



1. An array of gravity-held-in-place-horizontal-modular-accessible-tiles, comprising, in combination, a horizontal-base-surface, a cushioning-granular-substrate disposed over said horizontal-base-surface, and a plurality of said modular-access-

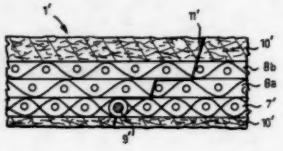
ible-tiles loose laid over said cushioning-granular-substrate, said modular-accessible-tiles joined one to another into said array of modular-accessible-tiles by means of a dynamic-interactive-fluidtight-flexible-joint comprising an elastomeric sealant.

4,698,250

METHOD FOR THE MANUFACTURE OF A PRESS FELT AND PRESS FELT

Tauno Talonen, and Riitta Niemi, both of Tampere, Finland, assignors to Tamfelt Oy Ab, Tampere, Finland

Filed Oct. 31, 1986, Ser. No. 925,478
Claims priority, application Finland, Nov. 1, 1985, 854292
Int. Cl.[4] B32B *5/02*
U.S. Cl. 428—58 **12 Claims**



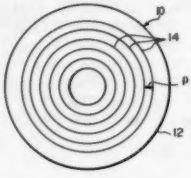
1. A press felt for a paper machine, comprising a seamed fabric and a fibrous layer needled at least on one side of the seamed fabric, the fibrous layer being incised in such a way that the seam of the seamed fabric is openable by removing a connecting thread and correspondingly rejoinable after the press felt is mounted in place in the paper machine by passing the connecting thread back in place so as to join the press felt into an endless loop, said press felt further comprising at least one surface fabric, which is provided at least on one surface of the seamed fabric between said seamed fabric and the fibrous layer, said incision extending through the surface fabric/s up to the seamed fabric.

4,698,251

MAGNETIC RECORDING MEDIUM AND METHOD OF PRODUCING THE SAME

Yasutaka Fukuda, Sagamihara; Shigeo Shimizu, and Atsushi Nakano, both of Yokohama, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Jan. 17, 1986, Ser. No. 820,494
Claims priority, application Japan, Jan. 22, 1985, 60-8321; Mar. 6, 1985, 60-42832
Int. Cl.[4] G11B *5/64, 5/82*
U.S. Cl. 428—64 **11 Claims**



1. A magnetic disk recording medium into and out of which data are recorded and reproduced by a head, comprising:

a non-magnetic substrate;

a non-magnetic thin layer provided on said substrate such that a lower surface of said non-magnetic thin layer contacts an upper surface of said substrate, an upper surface of said non-magnetic thin layer being processed to have scratch marks oriented generally in a circumferential direction of the magnetic disk recording medium, the depth of the scratch marks being in a range from 0.002 to 0.1 microns and the pitch between adjacent scratch marks in a radial direction ranging from 0.1 to 50 microns; and

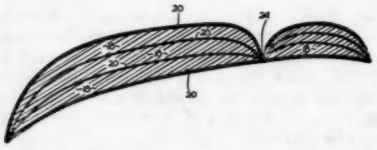
a magnetic layer provided on the scratch marked upper surface of the non-magnetic thin layer.

4,698,252

COMPOSITE FOAM ARTICLES AND METHOD FOR FABRICATING SUCH ARTICLES

G. Teryl Koch, Pataskala; Thomas L. Smith; Keith A. Jacklin, both of Reynoldsburg, all of Ohio, and James A. Hammond, Redlands, Calif., assignors to Colamco, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 604,005, Apr. 26, 1984, abandoned. This application Apr. 5, 1985, Ser. No. 720,373
Int. Cl.[4] B32B *3/26, 7/12, 31/12*
U.S. Cl. 428—159 **26 Claims**



23. A foam composite article comprising:

(a) a first flexible foam section;

(b) a second flexible foam section having the same properties as said first foam section, said second foam section having at least one surface which conforms to the surface contour of a surface of said first foam section for being adhesively joined into a unitary article;

(c) adhesive means disposed at room temperature between said surfaces to be joined for adhesively securing said first and said second foam sections together without the use of a cover material,

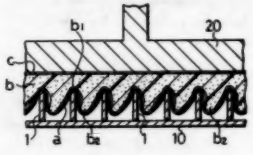
whereby said sections are maintained in a permanently elastically deformed condition.

4,698,253

INTERIOR COVER ASSEMBLY FOR A VEHICLE

Tomoaki Osawa, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

Filed Jul. 3, 1986, Ser. No. 881,839
Int. Cl.[4] B32B *3/30, 7/10*
U.S. Cl. 428—159 **6 Claims**



1. An interior cover assembly for a vehicle comprising a cushion member of foam material, said cushion member being provided on the surface thereof with a large number of projections and recesses extending crosswise and alternating with one another, and a covering member for covering said surface of said cushion member, wherein said covering member comprises a sheet shaped, thermally weldable covering member disposed over said cushion member, wherein said covering member has been pressed and heated in the areas corresponding to the respective said recesses in said cushion member so that said covering member is integrally welded to said recesses in said cushion member, so as to provide a plurality of welded portions therein, thereby causing said covering member to be pulled by said projections of said cushion members due to the elasticity thereof so as to produce a large number of decorative

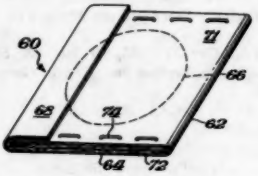
wrinkles in said covering member, mainly around said welded portions.

4,698,254

PACKAGING LAMINATE

Lewis R. Raszewski, Stevensville, Md., assignor to The Crowell Corporation, Newport, Del.

Continuation-in-part of Ser. No. 873,819, Jun. 13, 1986, Continuation-in-part of Ser. No. 783,430, Oct. 4, 1985. This application Dec. 12, 1986, Ser. No. 940,566
Int. Cl.[4] B32B *7/00, 15/08, 15/18, 15/20*
U.S. Cl. 428—215 8 Claims



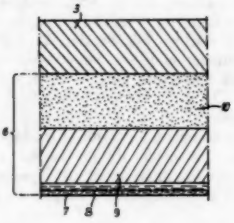
7. A packaging laminate having a layer of cushiony foam about 1 to about 7 millimeters thick laminated to foil at least about 0.5 mil thick of a metal having a magnetic permeability and remanence approximating those of pure iron.

4,698,255

MULTI-LAYER REFRACTORY STRUCTURE AND A WALL PROVIDED WITH SUCH A REFRACTORY STRUCTURE

Didier Pineau, Bordeaux, France, assignor to Societe Nationale Industrielle et Aerospatiale, Paris, France

Continuation-in-part of Ser. No. 824,519, Jan. 31, 1986. This application Feb. 2, 1987, Ser. No. 9,780
Claims priority, application France, Feb. 15, 1985, 85 02246
Int. Cl.[4] C04B *35/52*
U.S. Cl. 428—215 7 Claims



1. A multi-layer refractory structure capable of withstanding high temperatures of the order of 2000° C. to 2500° C. for hundreds of hours, comprising at least three layers, a first layer which is directly subjected to said high temperatures being formed from a simple or composite metal oxide or a zirconate and having a thickness between about 1 mm and 4 mm and a specific gravity between about 2.4 and 2.8;

a second layer which serves as support for said first layer having the same nature as said first layer and having a thickness between about 5 mm and 12 mm and a specific gravity between about 2.2 and 4.2; and

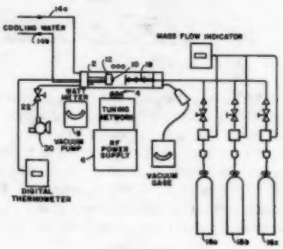
a third layer adapted to be supported by a metal wall and serving as support for said second layer and being formed from a refractory concrete having a linear expansion coefficient between about 1.4 and 1.8×10^{-6} per °C. and a thickness at least equal to 20 mm.

4,698,256

ARTICLES COATED WITH ADHERENT DIAMONDLIKE CARBON FILMS

Robert D. Giglia, Rye, N.Y., and Richard H. Clasen, West Redding, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 2, 1984, Ser. No. 595,845
Int. Cl.[4] B32B *9/00;* B05D *1/00*
U.S. Cl. 428—216 17 Claims



1. An article comprising:

(i) a solid substrate;

(ii) an intermediate layer adjacent at least one surface of said substrate, said layer comprising carbon which can be scratched by rubbing with steel wool; and

(iii) adjacent said intermediate layer an outer protective layer comprising diamondlike carbon.

4,698,257

WET-END MOLDED PRODUCT

John D. Goll, Sunbury, Pa., assignor to The Celotex Corporation, Tampa, Fla.

Continuation-in-part of Ser. No. 754,316, Jul. 12, 1985, which is a continuation of Ser. No. 440,042, Nov. 8, 1982, abandoned. This application Aug. 21, 1986, Ser. No. 898,677
Int. Cl.[4] B31F *1/00;* D03D *3/00, 15/00;* D04B *1/00*
U.S. Cl. 428—227 20 Claims

1. An assembly of individual, decoratively embossed fibrous boards having a well-defined, repeating surface pattern, each board of said assembly:

(a) being formed by a process comprising the steps of:

(i) forming an aqueous slurry of entangled mineral fibers;

(ii) dewatering said slurry to form a wet mat;

(iii) pressing said wet mat to consolidate said mat, said consolidated wet mat having from about 50 to 75% water;

(iv) pressure molding said consolidated wet mat at a pressure of about 2 to 50 psi while it is still wet by a molding means provided with a patterned surface layer to create a decorative textured surface on said consolidated wet mat; and

(v) drying said board; and

(b) having a higher strength than a board composed of substantially the same amounts of the same ingredients but produced by a dry embossing process.

4,698,258

SURFACE COVERING PRODUCT AND PROCESS THEREFOR

Joseph C. Harkins, Jr., 1 Hunters La., Chadds Ford, Pa. 19317

Filed May 22, 1986, Ser. No. 865,673

Int. Cl.[4] B32B *5/14, 5/18, 7/00, 17/04*

U.S. Cl. 428—285 **36 Claims**

1. A base web for a surface covering product comprising two substantially parallel fiber glass webs each of which is impregnated with a resinous composition and spaced apart from the other by a core layer of expandable resinous composition and an integral layer of resinous composition positioned on each side of the core layer which separates the surfaces of the core layer from the impregnated fiber glass webs and adheres the impregnated fiber glass webs to the core layer.

4,698,259

USE OF OXONATED POLY(ALKYLENE OXIDES) AS SURFACE TREATMENT AGENTS

Laurence R. B. Hervey, P.O. Box 363, Wells River, Vt. 05081

Filed Aug. 21, 1985, Ser. No. 767,898

Int. Cl.[4] D02G *3/00;* **B32B** *27/00;* **B05D** *3/02*

U.S. Cl. 428—378 **29 Claims**

1. A method of treating a solid substance that is substantially insoluble in water and which bears a negative electrostatic charge when it is wet with water, so as to reduce the negative charge without rendering the substance hydrophobic, which comprises contacting the substance with an acidic, aqueous solution of a poly(alkylene oxide) in which a sufficient number of the ether oxygen atoms have been oxonated with a Lewis acid to cause the poly(alkylene oxide) to adhere to the substance, said poly(alkylene oxide) being substantially devoid of substituents having hydrocarbon chains of 5 or more carbon atoms.

4,698,260

POLYESTER YARN

Yoshiyuki Sasaki, Takatsuki, and Katsuyuki Kasaoka, Ibaraki, both of Japan, assignors to Teijin Limited, Osaka, Japan

Division of Ser. No. 812,246, Dec. 23, 1985. This application Sep. 5, 1986, Ser. No. 904,177

Claims priority, application Japan, Dec. 24, 1984, 59-270633; Oct. 4, 1985, 60-220153; Oct. 8, 1985, 60-222664

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—399 **3 Claims**

1. A polyester multi-filament yarn of uneven thickness comprising a single filament having such a thickness unevenness that a denier ratio of a thicker portion to a thinner portion (thick-to-thin ratio) is more than 2.0 along the length thereof, wherein said yarn has a ratio of P50 to Pmax of less than $\frac{1}{4}$, a primary yield strength of more than 1.2 g/d, a breakage elongation of less than 33%,

wherein P50 stands for a value corresponding to a period 50 cm on a spectrogram of the yarn obtained from a normal test of a Uster spectrograph, and Pmax stands for the maximum value thereof.

4,698,261

POLYOLEFIN FILM HAVING IMPROVED MECHANICAL PROPERTIES

Lothar Bothe, Mainz-Gonsenheim, and Guenther Crass, Taunusstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 21, 1985, Ser. No. 789,756

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1984, 3438736

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—204 **14 Claims**

1. An opaque polyolefin film, comprising:

a multilayer polyolefin support film; and

two transparent or clear polyolefin covering layers, one of said covering layers covering each side of said support film;

said support film including an inner layer, and two separate intermediate layers, one intermediate layer covering each side of said inner layer, wherein at least one of said layers of said support film contains a filler in an amount sufficient to impart a pearlescent luster to said polyolefin film when said polyolefin film is biaxially oriented, and wherein at least one other layer of said support film comprises a polyolefin modified with one of a natural and a synthetic resin, said resin having a softening point range from about 70° C. to about 180° C.

4,698,262

FLUORESCENTLY LABELED MICROBEADS

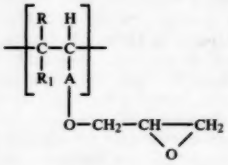
Abraham Schwartz, Durham; Joel Williams, Cary, and Robert D. Stevens, Durham, all of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 747,396, Jun. 21, 1985, abandoned, which is a continuation of Ser. No. 604,763, Apr. 27, 1984, abandoned. This application Jun. 30, 1986, Ser. No. 881,508

Int. Cl.[4] B32B *27/30;* **C08K** *5/01, 5/02*

U.S. Cl. 428—402 **3 Claims**

1. Microbeads comprising polymeric seed particles, a swelling agent having a molecular weight less than about 300 and a solubility in water less than about 10^{-2} grams per liter and from about 0.1% to about 50% by weight of a polymer of the formula



wherein R and R_1 are independently selected from the group consisting of hydrogen and lower alkyl of 1 to 6 carbon atoms and A is selected from the group consisting of a methylene or carbonyl group, said microbeads having a diameter from about 1 to 50 microns and having a size distribution within 10% of the mean.

4,698,263

SAC HAVING A MARKER LINKED THERETO

Daniel B. Wagner, Raleigh, N.C., and Robert A. Baffi, Devault, Pa., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.

Filed May 23, 1985, Ser. No. 737,244
Int. Cl.[4] A61K *9/42*; B01J *13/02*
U.S. Cl. 428—402.2 **9 Claims**

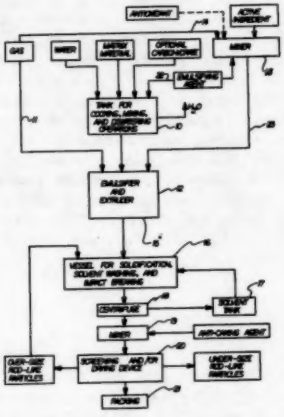
1. A composition comprising: a dry mixture of vesicle wall forming amphiphilic compounds, at least a portion of said compounds being a vesicle wall forming amphiphilic chelating agent, having a detectable metal atom complexed therewith.

4,698,264

PARTICULATE COMPOSITION AND PROCESS FOR MAKING SAME

James A. Steinke, Jacksonville, Fla., assignor to Durkee Industrial Foods, Corp., Iselin, N.J.

Continuation-in-part of Ser. No. 403,966, Aug. 2, 1982, abandoned. This application May 3, 1985, Ser. No. 730,756
Int. Cl.[4] A23L *1/222*; B01J *13/02*
U.S. Cl. 428—402.2 **14 Claims**



1. A solid, water-dispersible, delayed-release particulate composition comprising

a matrix;

a relatively small amount of an active ingredient insoluble in and uniformly distributed through the matrix;

the matrix comprising

(1) a normally solid, slowly water soluble or slightly water soluble and alcohol insoluble salt fusible to a glassy, solid texture selected from the group consisting of alkali metal and calcium phosphates, citrates, tartrates, carbonates, hydrates thereof and combinations thereof; and

(2) a readily cold water soluble bulking agent selected from the group consisting of maltodextin, a chemically modified food starch, polydextrose, polyhydric alcohol and combinations thereof;

the salt and bulking agent being present in the composition in a matrix forming amount and in the approximate ratio of 35:65 to 65:35 salt to bulking agent;

said particulate composition having a fused, glassy appearance and texture prepared by extrusion of the composition ingredients from a hot aqueous cook into a cold alcohol bath; said particulate composition being substantially free of active ingredient on the external surface thereof.

12. A method of preparing a water dispersible, delayed-release particulate composition comprising the steps of

(a) forming a hot aqueous cook of matrix ingredients and carrying out the heating of said cook until a moisture content of less than about 10% is obtained;

(b) dispersing within such cook an active ingredient;

(c) extruding the cook and active ingredient into a cold alcohol bath at a temperature effective for solidifying the matrix; and

(d) separating the extruded material into finely divided particles,

said matrix ingredients comprising

(1) a normally solid, slowly water soluble or slightly water soluble and alcohol insoluble salt fusible to a glassy, solid texture selected from the group consisting of alkali metal and calcium phosphates, citrates, tartrates, carbonates, hydrates thereof, and combinations thereof; and

(2) a readily cold water soluble bulking agent selected from the group consisting of maltodextrin, a chemically modified food starch, polydextrose, a polyhydric alcohol and combinations thereof;

the salt and bulking agent being present in the composition in a matrix forming amount and in the approximate ratio of 35:65 to 65:35 salt to bulking agent;

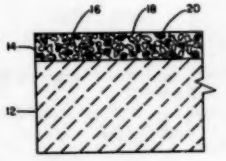
said matrix having a fused, glassy appearance and texture and being substantially free of active ingredient on the external surface thereof.

4,698,265

BASE METAL RESISTOR

Charles C. Y. Kuo, Elkhart, Ind., assignor to CTS Corporation, Elkhart, Ind.

Division of Ser. No. 705,233, Feb. 25, 1985, Pat. No. 4,655,965. This application Apr. 7, 1986, Ser. No. 848,976
Int. Cl.[4] B32B *17/06*
U.S. Cl. 428—432 **6 Claims**



1. A thick film base metal resistor having a substrate with a resistive paint screened and fired thereon, wherein the improvement comprises:

(a) blending a tantala glass frit with a tin oxide in the ratio of one part tantala glass frit with three to four parts tin oxide;

(b) mixing the combined tantala glass frit and tin oxide with a screening agent in the ratio of 25 to 35% by weight screening agent to 65 to 75% of the blend of tantala glass frit and tin oxide to yield a resistive paint;

(c) screening the resistive paint upon a substrate, and

(d) subsequently firing the substrate with resistive paint screened thereon in an inert atmosphere at a peak temperature of 900° C.±20° C.

4,698,266

COATED CEMENTED CARBIDE TOOL FOR STEEL ROUGHING APPLICATIONS AND METHODS FOR MACHINING

Sergei-Tomislav V. Buljan, Acton; Helmut Lingertat, Dorchester; J. Gary Baldoni, Walpole, and Vinod K. Sarin, Lexington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Nov. 18, 1985, Ser. No. 799,088
Int. Cl.[4] B22F *5/00*; C22C *29/00*
U.S. Cl. 428—457 **10 Claims**

1. A coated cemented carbide cutting tool comprising a

densified body having tungsten carbide grains, metal carbide grains selected from the group consisting of TiC, TaC, NbC, HfC, and combinations thereof, a bonding phase consisting essentially of cobalt, and an adherent refractory coating layer; said tungsten carbide grains being equal to or greater than 70 weight percent of said densified body; said cobalt being from about 5 to about 10 weight percent of said densified body; and the remainder being said metal carbide grains; said tungsten carbide grains having an average grain size from about 0.9 to about 1.3 microns and less than 10 percent of said tungsten carbide grains having a size less than 0.5 microns.

4,698,267

HIGH DENSITY PARA-ARAMID PAPERS

Edward W. Tokarsky, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 775,577, Sep. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 662,938, Oct. 19, 1984, abandoned. This application Mar. 13, 1986, Ser. No. 839,270

Int. Cl.[4] B32B *27/34;* **D21F** *11/00*

U.S. Cl. 428—474.4 **10 Claims**

1. Process for preparing high density para-aramid paper for use in electrical circuit board laminates having low coefficient of thermal expansion comprising the steps of (1) preparing a 0.01 to 3 percent, by weight, aqueous slurry of para-aramid fibers made up of 0–50 volume percent para-aramid pulp and 50–100 volume percent para-aramid floc having lengths of 0.8 to 12.7 mm, (2) forming a sheet from the slurry using known papermaking methods, (3) drying the thusly formed sheet and (4) calendering the sheet in one or more steps between rigid rolls heated to 125° to 400° C. at a pressure of 1500 to 5000 lbs/inch (268 to 894 kg/cm) nip pressure.

4,698,268

HEAT-SENSITIVE TRANSFERRING RECORDING MEDIUM

Seiji Ueyama, Hirakata, Japan, assignor to General Company Limited, Osaka, Japan

Filed Jul. 29, 1985, Ser. No. 759,853

Int. Cl.[4] B41M *5/26*

U.S. Cl. 428—484 **4 Claims**

1. A heat-sensitive transferring recording medium which comprises a heat resistant substrate and a heat-sensitive transferring ink layer overlying the heat resistant substrate, the heat-sensitive transferring ink consisting essentially of (1) a wax of penetration (JIS K 2235) of not higher than 25 (at 25° C.), (2) a resin component composed of both ethylene-vinyl acetate copolymer and aromatic modified terpene resin, and (3) a coloring agent, and the content of the resin component being 10–30% by weight based on the solid matter in the heat-sensitive transferring ink.

4,698,269

SINTERED, CORROSION-RESISTANT POWDERED METAL PRODUCT AND ITS MANUFACTURE

Michael J. Narusch, Jr., 12885 Greenbrier Dr., Chardon, Ohio 44024, and Stanley G. LeBail, 24 Dorchester Rd., Painesville Township, Lake County, Ohio 44077

Filed May 8, 1986, Ser. No. 861,004

Int. Cl.[4] B22F *3/00*

U.S. Cl. 428—552 **19 Claims**

1. A sintered powdered metal in coated form, the coating being an undercoat/topcoat composite, the undercoat on the sintered powdered metal being a phosphatized coating from solvent phosphatizing composition and the topcoating over the phosphatized sintered powdered metal being a cured residue from a chromium-containing coating composition.

4,698,270

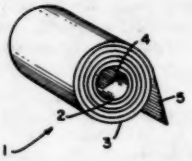
CORROSION RESISTANT THERMOSTATIC COIL

Jacob J. Ornstein, Reidsville, N.C., assignor to GTE Products Corpo ation, Stamford, Conn.

Continuation-in-part of Ser. No. 309,620, Oct. 8, 1987, abandoned. This application Nov. 17, 1986, Ser. No. 931,106

Int. Cl.[4] B32B *15/18*

U.S. Cl. 428—617 **3 Claims**



1. A thermostatic coil comprising a four layer thermostatic metal having a coiled spiral shape and having an inner end and an outer end, the four layer thermostatic metal comprising a low expansion layer of 36Ni- balance Fe metallurgically bonded to a high expansion layer of about equal thickness of 22Ni-3Cr- balance Fe, said low expansion layer having metallurgically bonded thereto a thinner low expansion layer of a corrosion resistant alloy of 38Ni-7Cr-balance Fe, the thickness of said thinner low expansion layer being about 5% of the total thickness of the four layer thermostatic metal, said high expansion layer having metallurgically bonded thereto a thinner high expansion layer of a corrosion resistant alloy of 19Ni-7Cr balance Fe, the thickness of said thinner high expansion layer being about 5% of the total thickness of the four layer thermostatic metal, the thinner low expansion layer being on the outer surface of the coil so that when the coil is heated with the inner end of the coil fixed to prevent movement thereof, the coil will expand.

4,698,271

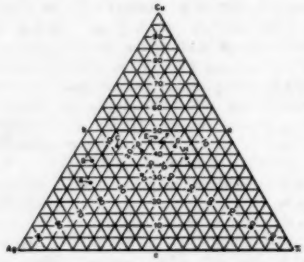
COPPER-SILVER-TITANIUM FILLER METAL FOR DIRECT BRAZING OF STRUCTURAL CERAMICS

Arthur J. Moorhead, Knoxville, Tenn., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Dec. 30, 1985, Ser. No. 814,942

Int. Cl.[4] B32B *15/04*

U.S. Cl. 428—621 **2 Claims**



2. A composite body comprising at least two structural components of ceramics or metals joined with brazing filler metal disposed thereinbetween consisting of 35 to 50 atomic percent copper, 15 to 50 atomic percent silver and 10 to 45 atomic percent titanium.

4,698,272

EXTRA-LOW IRON LOSS GRAIN ORIENTED SILICON STEEL SHEETS

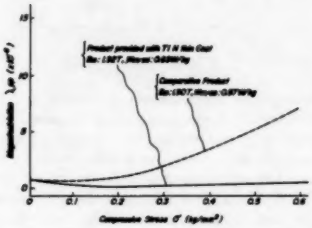
Yukio Inokuti, and Yo Ito, both of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Feb. 21, 1986, Ser. No. 832,172

Claims priority, application Japan, Feb. 22, 1985, 60-32935; Apr. 22, 1985, 60-84523; Jul. 23, 1985, 60-161221; Jul. 23, 1985, 60-161223; Jul. 23, 1985, 60-161227; Jul. 23, 1985, 60-161228; Aug. 16, 1985, 60-180161; Aug. 16, 1985, 60-180162; Aug. 16, 1985, 60-180163; Aug. 16, 1985, 60-180164; Dec. 17, 1985, 60-282053; Feb. 6, 1986, 61-22848

Int. Cl.[4] B32B *15/04*

U.S. Cl. 428—627 12 Claims



1. An extra-low iron loss grain oriented silicon steel sheet comprising a base metal of grain oriented silicon steel and a thin coat of at least one layer composed of at least one of nitrides and carbides of Ti, Zr, Hf, V, Nb, Ta, Mn, Cr, Mo, W, Co, Ni, Al, B and Si and strongly adhered to all finished surfaces of the base metal through a mixed layer of the base metal and the thin coat, and having a thickness of 0.005–2 μm.

4,698,273

MULTI-LAYERED FERROMAGNETIC FILM AND METHOD OF MANUFACTURING THE SAME

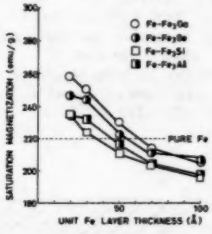
Matahiro Komuro, Hitachi; Yuzo Kozono, Hitachi-oota; Takeshi Yasuda, Hitachi; Shinji Narishige; Masanobu Hanazono, both of Mito, and Tetsuro Kuroda, Takahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,333

Claims priority, application Japan, Oct. 11, 1985, 60-224758

Int. Cl.[4] G11B *5/66*; C23C *14/14*

U.S. Cl. 428—635 10 Claims



5. A method of manufacturing a multi-layered ferromagnetic film comprising:

a step of depositing a ferromagnetic iron compound on a substrate to form a unit ferromagnetic iron compound layer with a predetermined thickness, said ferromagnetic iron compound essentially consists of at least one compound selected from the group consisting of Fe_3Al, Fe_3Si, Fe_3Ge, Fe_3Ga, Fe_3Pt and Fe_3Sn;

a step of depositing an iron layer on said unit ferromagnetic iron compound layer to form a unit iron layer with a predetermined thickness;

a step of depositing the ferromagnetic iron compound on said unit iron layer to form another unit ferromagnetic iron compound layer with a predetermined thickness; and

a step of repeating said second and third depositing steps so as to form an alternate lamination of said unit ferromagnetic iron compound layers and said unit iron layers whereby the magnetic moment per iron atom in said unit iron layer is enhanced due to an increase of interatomic distance in said unit iron layer.

4,698,274

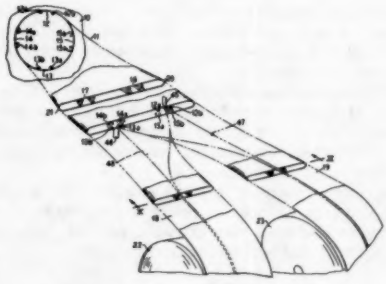
QUADRUPLE PROFILE PLASTIC TUBING FOR MAKING BAGS

Steven Ausnit, New York, N.Y., and Donald L. Van Erden, Wildwood, Ill., assignors to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 471,740, Mar. 3, 1983. This application Dec. 11, 1985, Ser. No. 807,794

Int. Cl.[4] B31B *23/18, 23/84*

U.S. Cl. 428—36 7 Claims



6. A plastic film structure for forming bags with integral pressure interlocking rib and groove elements on the confronting top edges comprising in combination:

a continuous one-piece tube having on the surface thereof a plurality of pairs in multiples of two of profiles extending longitudinally along the tube, the profiles of each pair being more closely circumferentially spaced to each other than the spacing between circumferentially adjacent pairs;

the tube material in the space between pairs providing the top edges of a bag and the tube material between adjacent pairs providing the wall area of a bag;

the profiles being rib and groove elements shaped to pressure interlock with each other and arranged so that when the tube is slit longitudinally between elements of circumferentially alternate pairs and folded to bring the profile element beside the slit over onto the closest profile of the circumferentially adjacent unslit pair the profiles will mate and interlock and whereby pairs of bags will be formed with the two bags of each pair joined by the tube material between the unslit pair of profiles.

4,698,275

WIRE MAT MATEABLE WITH A CIRCUIT BOARD

Richard C. Holt, Fairhaven, Mass., assignor to Augat Inc., Mansfield, Mass.

Continuation of Ser. No. 549,484, Nov. 4, 1983, Pat. No. 4,627,162. This application Jul. 16, 1986, Ser. No. 886,549

Int. Cl.[4] D06N *3/18*

U.S. Cl. 428—40 3 Claims

1. A wire mat mateable and precisely alignable with a circuit board having a plurality of conductive pads disposed in a predetermined layout and for use in the manufacture of a wired circuit board having a predetermined interconnection pattern of said conductive pads comprising:

a layer of adhesive material having a first side and a second side and having a predetermined coefficient of adhesion;

a flexible supporting layer adhered to said first side of said layer of adhesive material;

said coefficient of adhesion being selected to permit peelable removal of said supporting layer from said layer of adhesive material;

a continuous insulated wire routed along a predetermined path selected to correspond to said predetermined pattern for interconnection of said conductive pads and disposed in adhered contact with said layer of adhesive material along substantially the entire length thereof, said wire

being severable to permit selected interconnection of ones of said pads upon mating of said mat with said circuit board to achieve a desired interconnection pattern of said conductive pads;

said continuous insulated wire crossing over itself at a plurality of points along said predetermined path so as to form an overlaying portion and an underlying portion at each of said points wherein said overlaying portion is insulated from said underlying portion;

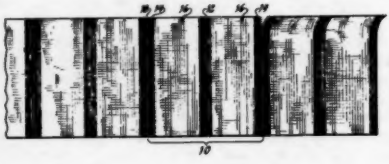
means for precisely aligning said wire mat with said circuit board such that selected points of said continuous wire confront selected ones of said conductive paths upon mating of said mat with said circuit board.

4,698,276

DIFFERENTIAL DENSITY FABRIC

Paul A. Duval, Greensboro, N.C., assignor to Guilford Mills, Inc., Greensboro, N.C.

Filed May 23, 1986, Ser. No. 866,799
Int. Cl.[4] B32B *3/12*
U.S. Cl. 428—116 **9 Claims**



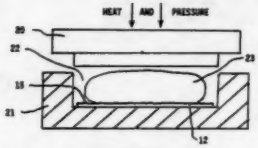
1. A sheer textile fabric for use in forming expandable honeycomb window panels and the like, such textile fabric comprising a plurality of adjacent strips of fabric extending parallel to one another with each said strip being formed with a longitudinally extending center portion having a predetermined width and a predetermined high fabric density, two end portions extending generall parallel to said center portion and in spaced relation thereto, each of said end portions having a predetermined width substantially one-half of the said width of said center portion and having a predetermined high density, and two intermediate portions extending, respectively, between said center portion and said two end portions, said intermediate portions being formed of an open-mesh fabric having a substantially lesser fabric density than said center portion and said end portions.

4,698,277

HIGH-TEMPERATURE LAMINATED INSULATING MEMBER

Eric W. Bayer, North East, Pa., assignor to General Electric Company, Erie, Pa.

Filed Nov. 12, 1986, Ser. No. 929,461
Int. Cl.[4] B32B *3/00, 3/30, 7/02, 9/00*
U.S. Cl. 428—141 **13 Claims**



1. An asbestos-free, rigid, unitary, laminated member characterized by relatively high dielectric and flexural strength and suitable for use as an electric insulator and physical support in high-temperature applications, the member having a first layer joined on one side to a second layer, wherein:

a. said first layer is a hard refractory material that was fully cured separate from said second layer, the inboard side of said first layer having a relatively coarse surface and the mean thickness of said first layer exceeding approximately 30 mils; and

b. said second layer is a molded compound comprising electrically non-conductive fibrous material impregnated with a thermoset resin that was cured after the compound was placed under pressure in a heated mold in direct contact with said inboard side of said first layer so that said resin penetrates the interstices of said coarse surface to form an interlayer bond that will remain physically stable as the temperature at the outboard side of said first layer varies over a wide range.

4,698,278

THREE-LAYER LAMINATED PANEL AND METHOD FOR PRODUCTION

Jorgen S. Prang, Langeskov, Denmark, assignor to Alliance Pentagon A/S, Odense, Denmark

Filed Oct. 21, 1986, Ser. No. 921,723
Claims priority, application Denmark, Oct. 21, 1985, 4822/85
Int. Cl.[4] B32B *3/26, 7/12, 15/04*
U.S. Cl. 428—314.4 **13 Claims**

1. A three-layer laminated panel comprising:

a closed cell polyurethane foam sheet having a density of at least 40 kg/m^3; and

outer facing sheets of metal bonded thereto with a polychloroprene rubber-based contact adhesive, at least one of the facing sheets being a metal sheet which is glass enamelled on both sides.

4,698,279

MAGNETIC RECORDING MEDIUM

Kenji Sumiya, Suita, and Yoji Takeuchi, Takatsuki, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Oct. 15, 1986, Ser. No. 918,975
Claims priority, application Japan, Oct. 15, 1985, 60-230572
Int. Cl.[4] G11B 5/72
U.S. Cl. 428—411.1 **5 Claims**

1. A magnetic recording medium which comprises a non-magnetic support, a magnetic layer provided on one surface (i.e. the major surface) of said support and a back coat layer provided on the other surface (i.e. the back surface) of said support, the magnetic layer comprising a magnetic metal, the back coat layer comprising a resinous binder and a salt formed between a nitrogen-containing heterocyclic compound and an aliphatic amine.

4,698,280

MAGNETIC RECORDING MEDIUM

Kiyomitsu Mine; Yayoi Kobayashi; Yasushi Kawaguchi, and Hiroyuki Inokuma, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Sep. 9, 1985, Ser. No. 773,808
Claims priority, application Japan, Sep. 14, 1984, 59-193152; Mar. 20, 1985, 60-54382
Int. Cl.[4] G11B 5/72
U.S. Cl. 428—425.9 **12 Claims**

1. A magnetic recording medium having a magnetic layer and optionally a backing layer, wherein at least one of said magnetic layer and said backing layer contains a fungicide selected from the group consisting of
2-(4-thiazolyl) benzimidazole,
N-(fluorodichloromethylthio)-phthalimide,
N,N-dimethyl-N'-fluorodichloromethylthio-sulfamide
2,3,5,6-tetrachloro-4-methylsulfonyl-pyridine,
2-octylisothiazoline-3-one,
hexahydro-1,3,5-tris-(2-hydroxyethyl)-sym-triazine,
benzylbromoacetate,
2-pyridinethiol sodium-1-oxide,
potassium-N-hydroxymethyl-N-methylthiocarbamate and
dithio-2', 2' bis (benzomethylamide).

4,698,281

GARNET-TYPE MAGNETIC MATERIAL HIGH FARADAY ROTATION MAGNETIC FILM CONTAINING SUCH A MATERIAL AND PROCESS FOR THE PRODUCTION THEREOF

Marie-Francoise Armand, Grenoble; Jacques Daval, Meylan; Bernard Ferrand, Voreppe, and Hubert Moriceau, Seyssins, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 15, 1985, Ser. No. 787,062
Claims priority, application France, Nov. 2, 1984, 84 16763
Int. Cl.[4] G11B 7/24
U.S. Cl. 428—692 **6 Claims**

1. A magneto-optic device comprising, on a substrate, a magneto-optic material of the formula:

$$Gd_{2-x1-x2}M_{x1}Pr_{x2}Bi_1Fe_{5-y1-y2}Ga_{y1}Al_{y2}O_{12}$$

in which M represents at least one rare earth element selected from the group consisting of lutetium, thulium, ytterbium, and yttrium and x_1, x_2, y_1 and y_2 are such that:

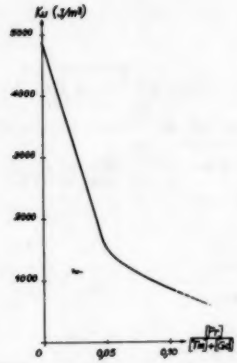
$$0<x_1<1.5$$

$$0<x_2<0.5$$

$$0\leqq y_1<1$$

$$0\leqq y_2 1$$

provided that y_1 and y_2 are not both equal to 0 and that y_1+y_2 is at most equal to 1, wherein the compensation temperature of the magneto-optic material is below ambient temperature, the uniaxial magnetic anisotropy field is between 0 and 2×10^5



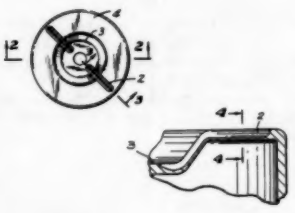
A/m and the specific Faraday rotation at 6238 Angstroms is about 1,750,000°/m.

4,698,282

SAFETY VENT DEVICE FOR ELECTROCHEMICAL CELLS

Ralph Mantello, Northvale, N.J., assignor to Power Conversion Inc., Elmwood Park, N.J.

Filed Jun. 2, 1986, Ser. No. 869,975
Int. Cl.[4] H01M 2/12
U.S. Cl. 429—56 **2 Claims**



1. A safety vent device for use with a normally sealed, electrochemical cell, said cell comprising two cylindrical end portions each having a nominal thickness throughout the surface area of said cylindrical end portions, said cylindrical end portions connected by an upstanding cylindrical sidewall, said safety vent device comprising:

a circular recessed portion positioned in a first cylindrical end portion of said normally sealed cell, said first cylindrical end portion being substantially flat, said circular recessed portion having a diameter less than the diameter of said first cylindrical end portion and being positioned generally in the center of said first cylindrical end portion;

at least one scored line extending radially from an edge of said recessed portion to the upstanding sidewall of said normally sealed cell, said scored line functioning to reduce the nominal thickness of said first cylindrical end portion, and;

said safety vent device remaining in a closed position to fully seal said normally sealed cell until an excessive pressure within said normally sealed cell urges said circular recessed portion positioned in said one cylindrical end portion to deflect, in turn causing said safety vent device to

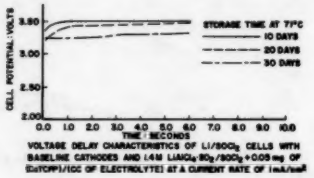
rupture along said score line thus unsealing said normally sealed cell and releasing said pressure.

4,698,283

ELECTROCHEMICAL CELL HAVING IMPROVED ACTIVE LIFE

Narayan Doddapaneni, Glenside, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 25, 1986, Ser. No. 911,578
Int. Cl.[4] H01M *4/36*
U.S. Cl. 429—101 **21 Claims**



VOLTAGE DELAY CHARACTERISTICS OF $Li/SOCl_2$ CELLS WITH BASELINE CATHODES AND (4M $LiAlCl_4$ $SO_2/SOCl_2$ + 0.05 mg OF [CoTCPP]/CC OF ELECTROLYTE) AT A CURRENT RATE OF 1 mA/cm²

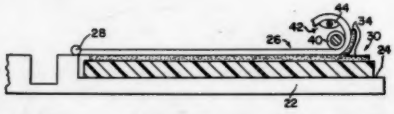
1. In an electrochemical cell having an active metal anode, an electrolyte solution comprising an oxychloride solvent depolarizer containing a metal salt of the anode and a cathode, the improvement comprising an amount of additive in said electrolyte selected from the group consisting of CoTCPP and CoTCPC and mixtures thereof.

4,698,284

DEVICE FOR ALIGNING A PHOTOMASK ONTO A PRINTED WIRING BOARD

John V. Cronin, Newport Beach, Calif., assignor to M&T Chemicals Inc., Woodbridge, N.J.

Filed Oct. 25, 1985, Ser. No. 791,256
Int. Cl.[4] G03F *9/00*; H01M *8/10*; G03B *21/22*
U.S. Cl. 430—5 **9 Claims**



1. An apparatus for applying a flexible phototool to a light sensitive receiving element comprising:

a housing;

support means for supporting the light sensitive receiving element in the housing;

securing means for securing one end of the flexible phototool to said housing for registration with said light sensitive receiving element;

applying means for applying the flexible phototool to the light sensitive receiving element; and

maintaining means for maintaining the flexible phototool under tension while it is being applied to the light sensitive receiving element, said maintaining means being

separate from said applying means, and

positioned adjacent said applying means and between said applying means and a free end of said phototool when said applying means applies the flexible phototool to the light sensitive receiving element.

4,698,285

METHOD FOR PRODUCING DEEP-ETCH, X-RAY LITHOGRAPHY MASKS

Wolfgang Ehrfeld, Karlsruhe; Asim Maner, and Dietrich Münchmeyer, both of Stutensee, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Aug. 20, 1986, Ser. No. 898,081
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3529966
Int. Cl.[4] G03F *9/00*
U.S. Cl. 430—5 **10 Claims**

1. A method for producing a mask for deep-etch X-Ray lithography, the mask including a mounting frame; a carrier membrane tautly tensioned over the mounting frame and having a first side and a second side, the second side facing the mounting frame, and being substantially transmissive to X-ray radiation; and absorber structures comprised of at least one element having a high atomic number and provided on the second side of the carrier membrane in a mask pattern, which absorber structures strongly absorb X-ray radiation, the method comprising:

a. producing a thin-film mask on the first side of the carrier membrane, the thin-film mask having absorber structures which absorb X-ray radiation and which are provided in a mask pattern which is complementary to that of the mask for X-ray lithography to be produced;

b. applying an X-ray resist layer on the second side of the carrier membrane, which X-ray resist layer is comprised of a positive resist material and has a thickness which corresponds to that of the absorber structures of the mask for X-ray lithography to be produced;

c. irradiating portions of the X-ray resist layer with substantially parallel, X-ray radiation through the thin film mask;

d. removing the irradiated portions of the X-ray resist layer by dissolving same in a developer to expose portions of the second side of the carrier member;

e. electrolytically depositing at least one element having a high atomic number onto the exposed portions of the second side of the carrier member and to a thickness of up to that which corresponds to that of the X-ray resist layer, whereby absorber structures are provided for the mask for X-ray lithography to be produced;

f. removing the non-irradiated portions of the X-ray resist layer; and

g. removing the thin-film mask by etching, whereby a mask for deep-etch X-ray lithography is produced.

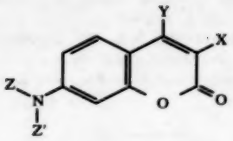
4,698,286

PLASMA DEVELOPABLE PHOTORESIST COMPOSITIONS CONTAINING PERYLENE COUMARIN PHOTOSENSITIZER

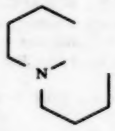
Wayne R. Messer, Landenberg, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jun. 3, 1985, Ser. No. 740,655
Int. Cl.[4] G03C *1/70*
U.S. Cl. 430—17 **11 Claims**

11. In an element comprising a substrate coated with a photoresist composition comprising at least one N-vinyl monomer, a haloalkene photoinitiator, a polymeric binder and a photosensitizer, wherein the composition has been exposed imagewise to a sufficient amount of electromagnetic radiation to polymerize the monomers therein and developed in a manner sufficient to remove the composition from the unexposed areas of the coated substrate, the improvement wherein the photosensitizer comprises a coumarin compound of the general formula



wherein: X is H, CN, COR, or CO_2R' wherein R' is hydrogen or lower alkyl, and R is lower alkyl, phenyl, or lower alkyl substituted phenyl; Y is H or CF_3; Z and Z' are independently lower alkyl or collectively members of a structure having the configuration



either X or Y must be H; and both X and Y cannot be H.

4,698,287

PHOTOSENSITIVE MEMBER HAVING AN AMORPHOUS SILICON LAYER

Izumi Osawa, Ikeda; Isao Doi, Toyonaka, and Toshiya Natsuhara, Amagasaki, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 28, 1985, Ser. No. 791,710

Claims priority, application Japan, Nov. 5, 1984, SHO 59-232879

Int. Cl.[4] G03G *5/085*

U.S. Cl. 430—57 **6 Claims**

1. A photosensitive member which comprises:

a conductive substrate;

a first amorphous silicon: germanium layer having a thickness of more that about 0.05 μm and including oxygen and/or carbon, more than about 10 atomic % of germanium and about 10 to 10,000 ppm of an impurity element in Group IIIA of the Periodic Table or about 5 to 200 ppm of an impurity element in Group VA of the Periodic Table;

an amorphous silicon layer formed on the first amorphous silicon: germanium layer and having a thickness of about 10 to 100 μm, said amorphous silicon layer including oxygen and less than about 200 ppm of an impurity element in Group IIIA of the the Periodic Table or less than about 50 ppm of an impurity element in Group VA of the Periodic Table; and

a second amorphous silicon: germanium layer formed on said amorphous silicon layer and having a thickness of from about 1 to 4 μm, said second amorphous silicon: germanium layer including oxygen and/or carbon and less than about 40 atomic % of germanium.

4,698,288

ELECTROPHOTOGRAPHIC IMAGING MEMBERS HAVING A GROUND PLANE OF HYDROGENATED AMORPHOUS SILICON

Joseph Mort, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 19, 1985, Ser. No. 810,639

Int. Cl.[4] G03G *5/10*

U.S. Cl. 430—58 **46 Claims**

1. A photoresponsive imaging member comprised of a supporting insulating a substrate, ground plane of hydrogenated amorphous silicon having incorporated therein as dopants elements selected from Groups III and V of the periodic table; and in contact therewith a photoconductive layer of hydrogenated amorphous silicon.

4,698,289

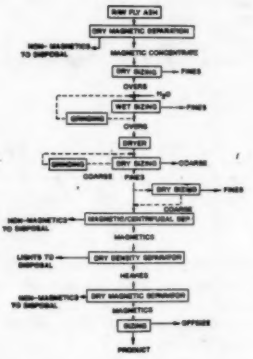
PROCESS FOR MAKING FERRITE SPHERICAL PARTICULATE TONER CORE FROM RAW FLY ASH

Robert G. Aldrich, Manlius; Geoffrey H. Earl, Erieville, and David W. Trunko, Lafayette, all of N.Y., assignors to Hallomet Inc., Syracuse, N.Y.

Division of Ser. No. 640,813, Aug. 15, 1984, Pat. No. 4,592,988. This application Feb. 27, 1986, Ser. No. 833,992

Int. Cl.[4] G01G *9/00, 9/14, 9/10*; C03G *49/08*

U.S. Cl. 430—106.6 **1 Claim**



1. A process for making a ferrite spherical particulate toner carrier core from raw fly ash obtained from burning coal comprising

(a) recovering the magnetic particles from the non-magnetic particles of the raw fly ash;

(b) selecting a desired size for the particles of the raw fly ash and screening the fly ash to obtain the desired sized particles; and

(c) purifying the raw fly ash treated according to steps (a) and (b) to obtain a ferrite composition having a particle size from 20–300 microns, in which the particles are essentially spherical, having an apparent density of at least 1.8 g/cm^3; a saturation magnetization of 43–70 emu/g; a remanence of 5 emu/g or less; a Hall Flow of 20 sec. or greater/50 g.

4,698,290

PROCESS FOR ENERGY REDUCTION WITH FLASH FUSING

John S. Berkes, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 11, 1985, Ser. No. 807,728

Int. Cl.[4] G03G *13/20, 9/08*

U.S. Cl. 430—124 **21 Claims**

1. A process for affecting a reduction in the energy needed for accomplishing the flash fusing of a developed image which comprises (1) providing a toner composition with resin particles, pigment articles, and wax, said wax possessing a lower melting temperature than the resin particles and selected from the group consisting of polyethylene and polypropylene with a molecular weight of less than about 6,000; (2) introducing the aforementioned toner composition into a xerographic imaging apparatus having incorporated therein a flash fusing device; (3) generating an electrostatic latent image in said imaging apparatus, and subsequently developing this image with said toner composition; (4) transferring the image to a supporting substrate; and (5) permanently attaching the image to the substrate with energy emitted from a flash fusing device, and wherein there is formed between the supporting substrate and the toner composition during fusing a wax layer.

4,698,291

PHOTOSENSITIVE COMPOSITION WITH 4-AZIDO-2'-METHOXYCHALCONE

Shigeru Koibuchi; Asao Isobe, both of Hitachi, and Daisuke Makino, Mito, all of Japan, assignors to Hitachi Chemical Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Continuation of Ser. No. 601,321, Apr. 17, 1984, abandoned. This application Jul. 17, 1986, Ser. No. 886,353

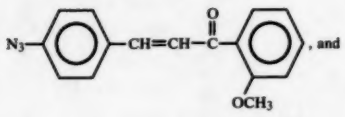
Claims priority, application Japan, Apr. 20, 1983, 58-69450; Apr. 21, 1983, 58-10726

Int. Cl.[4] G03C *1/52, 1/60, 1/72*

U.S. Cl. 430—196 7 Claims

1. A photosensitive composition comprising, in admixture,

(a) 4-azido-2?-methoxychalcone of the formula:



and

(b) an alkaline-aqueous-solution-soluble polymer which can be insolubilized in an alkaline aqueous solution by photochemical curing with the component (a); the proportion of the component (a) being 5 to 100% by weight based on the weight of the component (b);

(c) organic solvent selected from the group consisting of a ketone, a cellusolve and an ester or a mixture thereof, the content of the solvent in the composition being 100 to 2,000 parts by weight per 100 parts by weight of components (a) and (b); said composition exhibiting little viscosity change with a lapse of time when stored as a solution.

4,698,292

PHOTOPOLYMERIZABLE RECORDING ROLL MATERIAL WITH END CAPS

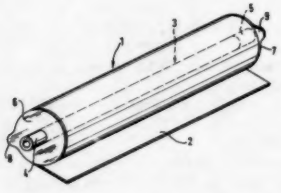
Manfred Hilger, Konz, and Norbert Klein, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 4, 1985, Ser. No. 784,490

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437453

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—273 11 Claims



1. A photopolymerizable recording material in the form of a roll having end faces, the recording material comprising:

a removable support film;

a photopolymerizable photoresist layer applied to the support film;

a flexible covering film applied to the exposed surface of the photoresist layer, said flexible covering film adhering less firmly to said photoresist layer than does said support film; and

means independent of said photoresist layer for preventing exuding of the photoresist layer at the roll end faces, said means comprising a separate, annular covering disk adhered to each end face of the roll, each of said covering disks comprising an adhesive-coated paper material, textile sheet or film sheet having its adhesive-coated side adhered to one of said roll end faces,

wherein said support film is flexible, transparent and dimensionally stable, and wherein said photoresist layer is thermoplastic and transferable from said support film.

4,698,293

PROCESS FOR FORMING POSITIVE TONABLE IMAGES USING A PHOTOSENSITIVE MATERIAL CONTAINING AT LEAST 1,4-DIHYDROPYRIDINE

Mario Grossa, Dreieich, Fed. Rep. of Germany, assignor to E. I. Du Pont de Nemours and Company, Wilminton, Del.

Filed Nov. 12, 1986, Ser. No. 929,376

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540796

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—291 12 Claims

1. Process for the production of powder images that are positive with respect to an original on at least one side of a substrate bearing, on at least one side, a layer of a light-sensitive composition that contains at least one 4-(2'-nitrophenyl)-1,4-dihydropyridine compound, and/or at least one 1,4-dihydropyridine compound and at least one hexaarylbisimidazole compound, comprising, in the stated order the steps of:

(a) exposing said light-sensitive layer imagewise to actinic radiation to produce tacky image areas;

(b) treating the light-sensitive layer with a strong inorganic or organic acid having a pKa value ≤ 2.0;

(c) exposing non-imagewise to actinic radiation or heating to produce tackiness in the areas not exposed to actinic radiation in step (a); and

(d) toning of the tacky areas with finely-divided powders.

4,698,294

LAMINATION OF PHOTOPOLYMERIZABLE FILM ONTO A SUBSTRATE EMPLOYING AN INTERMEDIATE NONPHOTOSENSITIVE LIQUID LAYER

Tit-Kueng Lau, Wilmington, Del., and Abraham B. Cohen, Springfield, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 12, 1986, Ser. No. 906,442

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—325 19 Claims

1. A process for laminating a photopolymerizable film to a substrate which comprises the steps of

(a) applying to a substrate surface or a photopolymerizable film surface which is preformed and nonliquid, a liquid which is substantially nonphotosensitive to actinic radiation and which consists essentially of at least one nongaseous ethylenically unsaturated compound containing at least one ethylenic group having a boiling point above 100° C. at normal atmospheric pressure and being capable of forming a high polymer by addition polymerization

(b) laminating the substrate and preformed nonliquid photopolymerizable film through the applied liquid whereby excess liquid is present during the lamination and is forced along at least one edge of the laminated substrate and film whereby adherence is obtained of the substrate to the film through the liquid;

(c) exposing imagewise to actinic radiation the photopolymerizable film and the liquid;

(d) removing unexposed areas of the photopolymerizable film and the liquid from the substrate.

4,698,295

POLYIMIDES, A PROCESS FOR THEIR PREPARATION AND THEIR USE, AND TETRACARBOXYLIC ACIDS AND TETRACARBOXYLIC ACID DERIVATIVES

Josef Pfeifer, Therwil, and Rudolf Duthaler, Zurich, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 8, 1985, Ser. No. 796,380

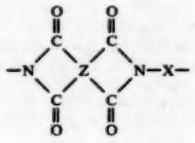
Claims priority, application Switzerland, Nov. 16, 1984, 5486/84

Int. Cl.[4] G03C 5/00; B03D 3/06

U.S. Cl. 430—325 38 Claims

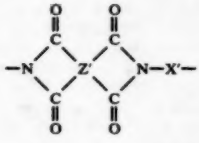
20. A process for the preparation of a relief image on a carrier which comprises

exposing to light or high-energy radiation imagewise through a photomask a radiation-sensitive polymer applied on said carrier wherein the polymer is a homopolyimide or a copolyimide of at least one aromatic tetracarboxylic acid and at least one diamine, which essentially contains 0.1 to 100 ml % of at least one structural element of the formula I

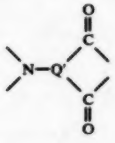


(I)

and 99.9 to 0 mol % of at least one structural element of the formulae II and/or III

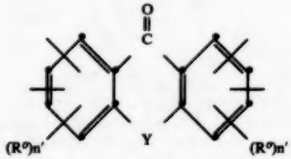


(II)

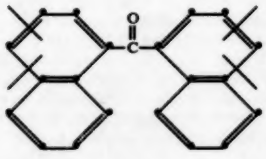


(III)

in which Z is at least one tetravalent radical of the formula IV, V, VI or VII

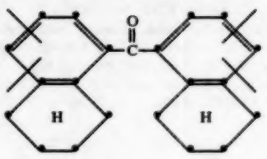


(IV)



(V)

-continued



(VI)

(VII)

in which the free bonds are in the ortho-position relative to one another and Y is a direct bond, —CH_2—, —$(CH_2)_2$—, —O—, —S—, —SO—, —SO_2—, —CO—, —NR— or —CRR^1—, in which R is a hydrogen atom, C_1–C_{10}-alkyl, phenyl, naphthyl or phenyl-(C_aH_{2a})-, where a is 1–4, and R^1 is R, with the exception of a hydrogen atom, R^o is C_1–C_{10}-alkyl, halogen, —CN, —NO_2, C_1–C_{12}-alkoxy, phenoxy, naphthoxy or phenyl-(C_aH_{2a})-, where a is 1–4, n' is 0, 1 or 2, X is an unsubstituted or substituted divalent aliphatic radical, or said radical interrupted by heteroatoms or aromatic, heterocyclic or cycloaliphatic groups, a substituted or unsubstituted heterocyclic, cycloaliphatic or araliphatic radical, an aromatic radical, in which two aryl nuclei are linked via an aliphatic group, or an aromatic radical which is substituted by at least one alkyl group, cycloalkyl group, alkoxy group, alkoxyalkyl group, alkylthio group, alkylthioalkyl group, hydroxyalkyl group, hydroxyalkoxy group, hydroxyalkylthio group, aralkyl group or, in the case of two adjacent C atoms of the aromatic radical, by an alkylene group, Q' is a trivalent aromatic radical, Z' has the same meansing as Z or is a tetravalent organic radical other than Z and X' is the divalent radical, other than X, of an organic diamine, and in which Z in formula I is also a tetravalent benzophenone radical if structural elements of the formula III are present, and

then removing the non-exposed portions with a solvent.

4,698,296

PROCESSLESS COLOR IMAGING AND FILM THEREFOR

David F. Lewis, Monroe, Conn., assignor to GAF Corporation, Wayne, N.J.

Filed Mar. 14, 1986, Ser. No. 839,390

Int. Cl.[4] G03C 7/20, 7/40, 7/00

U.S. Cl. 430—333 28 Claims

1. An image receptive film capable of multicolor development by energy transmitted by a source of radiant energy, which comprises:

(a) a first imaging layer composed of an aliphatic polymeric binder having from about 40 to about 70 wt. % labile halogen and capable of dehydrohalogenation at address points upon exposure to a source of radiant energy, said binder containing a uniformly dispersed leuco base polyphenylmethane compound capable of forming a halide salt dye upon generation of hydrogen halide from said binder;

(b) a separate imaging layer disposed below said first layer and composed of a uniformly dispersed photosensitive polyacetylenic compound having at least two acetylenic linkages in a conjugated system and capable of forming a dye of a color distinguishable from the halide salt dye upon exposure to a source of radiant energy and

(c) a conductive support for imaging layers (a) and (b).

4,698,297

SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Seiji Ichijima, and Noboru Sasaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

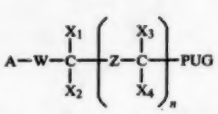
Filed May 28, 1985, Ser. No. 737,853

Claims priority, application Japan, May 25, 1984, 59-106223

Int. Cl.[4] G03C *1/40, 1/06, 1/10, 1/42*

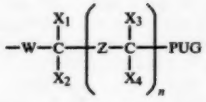
U.S. Cl. 430—383 **29 Claims**

1. A silver halide color photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion layer, the color photographic light-sensitive material containing a compound represented by the general formula **(Ia)**:



(Ia)

wherein W, Z, X_1, X_2, X_3, X_4, n and PUG are as defined below and A represents a coupler residue or a hydroquinone residue which releases a group represented by the general formula (I) described below upon reaction with the oxidation product of a developing agent:



(I)

wherein W and Z each represents an oxygen atom, a sulfur atom or a group of

X_1, X_2, X_3, X_4 and X_5 each represents a hydrogen atom or an organic residue; PUG represents a photographically useful group which is bonded to

via a hetero atom of PUG and is released as an anion following release of the groups represented by the general formula (I); n represents 1 or 2; any two of X_1, X_2, X_3, X_4, X_5 and PUG each represents a divalent group and may be connected to each other to form a cyclic structure; and when n represents 2, two Z's, two X_3's and two X_4's each may be the same or different.

4. A silver halide color photographic light-sensitive material as claimed in claim **1**, wherein the photographic light-sensitive material further contains a color forming coupler capable of forming a dye upon the reaction with the oxidation product of a developing agent.

27. A silver halide color photographic light-sensitive material as claimed in claim **4**, wherein the photographic light-sensitive material contains at least one red-sensitive silver halide emulsion layer containing at least one cyan color forming coupler, at least one green-sensitive silver halide emulsion layer containing at least one magenta color forming coupler and at least one blue-sensitive silver halide emulsion layer containing at least one yellow color forming coupler.

28. A silver halide color photographic light-sensitive material as claimed in claim **27**, wherein at least one of the at least one silver halide emulsion layer contains the compound represented by the formula (Ia).

29. A process for forming an image using the silver halide photographic light-sensitive material claimed in claim **28**, comprising imagewise exposing and developing the silver halide photographic light-sensitive material, wherein the developing is carried out with at least one developing agent which forms upon development of silver halide an oxidation product which reacts with the compound of the formula (Ia) to release the group (I) which in turn generates the PUG anion in said at least one emulsion layer, and wherein the hetero atom through which PUG is bonded as a sulphur atom, an nitrogen atom or an oxygen atom.

4,698,298

COMPETITIVE IMMUNOASSAY PROTOCAL FOR TARGETS INCLUDING LIPOPROTEINS AND ALPHA-FETOPROTEIN

Alain Dedieu, Avignon; Campbell Lockhart, and Etienne Jolu, both of Bagnols sur Cèze, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 3, 1984, Ser. No. 596,386

Int. Cl.[4] G01N *33/53, 33/535, 33/545, 33/574*

U.S. Cl. 435—7 **19 Claims**

1. A process for the immunological determination of a substance, which comprises the following steps:

(1) contacting a sample containing the substance to be determined with a labelled immunoactive reagent specific to said substance, the immunoactive reagent quantity being such that the substance to be determined is in excess compared with that labelled immunoactive reagent;

(2) contacting at least part of the reaction medium obtained in step (1) with a solid phase, to which is fixed a limited amount of an immunoactive reagent specific to the substance to be determined, whereby the excess unlabeled substance and the substance combined with the labeled immunoactive reagent resulting from step (1) compete for limited binding sites of the immunoactive reagent fixed to the solid phase;

(3) separating the reaction medium from the solid phase;

(4) determining the labelled immunoactive reagent content of the solid phase; and

(5) relating the determination of step (4) to a standard curve to determine the substance content of said sample.

4,698,299

LIPID-DEPENDENT DIAGNOSTIC ASSAYS

Andrew S. Janoff, Yardley, Pa.; Joyce Rauch, Montreal, and Colin P. S. Tilcock, Vancouver, both of Canada, assignors to The Liposome Company, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 702,555, Feb. 19, 1985. This application Feb. 19, 1986, Ser. No. 831,255

Int. Cl.[4] G01N *33/564, 33/571, 33/96*

U.S. Cl. 435—13 **14 Claims**

1. In a lipid-dependent diagnostic assay which is performed on a test sample and which is subject to false positives if the test sample includes anti-phospholipid antibodies, the improvement comprising pre-incubating the test sample with a bilayer-forming lysophospholipid.

4,698,300

PROCESS AND REAGENT FOR THE DETERMINATION OF α-AMYLASE

Eberhard Henkel, Hanover; Barkew Dolabdjian, Gross-Gerau; Roland Helger; Rainer Klink, both of Darmstadt, and Uwe Würzburg, Dieburg, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Jun. 28, 1984, Ser. No. 625,482

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1983, 3323245

Int. Cl.[4] C12Q *1/34, 1/40*

U.S. Cl. 435—18 7 Claims

1. A method for the determination of α-amylase in a sample comprising contacting the sample with α-glucosidase, β-glucosidase, and a substrate for α-amylase, wherein the substrate consists essentially of 2-chloro-4-nitrophenyl-β,D-maltoheptaoside, under conditions whereby said α-amylase, α-glucosidase and β-glucosidase will cleave the substituted 4-nitrophenyl group from the substrate, and

measuring resultant cleaved substituted 4-nitrophenyl group to determine the amount of α-amylase present in the sample.

4,698,301

ANGIOGENIC FACTOR PRODUCTION

Jacqueline B. Weiss, 69 Attwood Road, Didsbury, Manchester M20 OTB, and Christopher R. Hill, 10 A Holmes Crescent, Wokingham, Berkshire, both of England

Filed Nov. 29, 1983, Ser. No. 556,174

Claims priority, application United Kingdom, Nov. 30, 1982, 8234066

Int. Cl.[4] A61K *35/12;* C12P *1/00;* C08B *37/10*

U.S. Cl. 435—41 9 Claims

1. A method for the preparation of an angiogenic factor of molecular weight of between 300 and 600, and having the ability to activate pro-collagenase, which comprises the steps of:

(1) growing tumour cells in vitro in an aqueous nutrient culture medium by a suspension culture procedure so that said factor is released into the culture medium,

(2) separating the grown cells from the culture medium to obtain an extract containing said angiogenic factor in admixture with proteinaceous materials,

(3) treating the extract from step (2) to remove proteinaceous materials from it, and

(4) recovering the angiogenic factor of molecular weight of between 300 and 600 from the extract remaining from step (3).

4,698,302

ENZYMATIC REACTIONS USING MAGNETIC PARTICLES

Roy A. Whitehead, Hingham; Mark S. Chagnon, Lowell; Ernest V. Groman, Brookline and Lee Josephson, Arlington, all of Mass., assignors to Advanced Magnetics, Inc., Cambridge, Mass.

Division of Ser. No. 493,991, May 12, 1983, Pat. No. 4,554,088. This application Jun. 13, 1985, Ser. No. 744,457

Int. Cl.[4] C08F *283/12;* H01F *1/00;* C09D *5/23*

U.S. Cl. 435—94 16 Claims

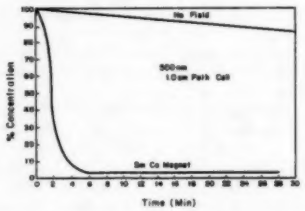
1. A method for carrying out an enzymatic reaction which comprises:

(a) contacting an enzyme covalently coupled to magnetically-responsive particles with a reaction medium to form a reaction mixture in a reaction vessel to effect an enzymatic reaction;

(b) allowing the enzymatic reaction to occur; and

(c) removing the enzyme from the reaction mixture by applying a magnetic field,

wherein the magnetically-responsive particles of step (a) individually comprise a magnetic metal oxide core generally surrounded by a coat of polymeric silane, a mass of the particles being dispersable in aqueous media to form an aqueous dispersion having (i) a fifty-percent-turbidity-decrease settling time of greater than about 1.5 hours in the absence of a magnetic field, and (ii) a ninty-five-percent-turbidity-decrease separation time of less than about 10 minutes in the presence of a magnetic



field, the magnetic field being applied to the aqueous dispersion by bringing a vessel containing a volume of the dispersion into contact with a pole face of a permanent magnet, the permanent magnet having a volume which is less than the volume of the aqueous dispersion in the vessel.

4,698,303

PRODUCTION OF LACTIC ACID BY CONTINUOUS FERMENTATION USING AN INEXPENSIVE RAW MATERIAL AND A SIMPLIFIED METHOD OF LACTIC ACID PURIFICATION

Richard B. Bailey, Cupertino, Calif.; Dilip K. Joshi, Kalamazoo, Mich.; Stephen L. Michaels, Newton, Mass., and Richard A. Wisdom, Foster City, Calif., assignors to Engenics, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 702,472, Feb. 15, 1985, abandoned, and a continuation-in-part of Ser. No. 687,189, Dec. 28, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 844,819

Int. Cl.[4] C12P *7/56;* C07C *59/08;* A23C *21/02*

U.S. Cl. 435—139 29 Claims

1. A process for producing lactic acid from whey comprising the steps of:

(a) providing a whey composition at an acidic pH from which a substantial portion of proteins having a molecular weight over 10,000 have been removed;

(b) treating said composition with a protease at a temperature in the range of 40° C. to 65° C. for a period sufficient to degrade proteins to smaller peptides and amino acids, said smaller peptides and amino acids characterized as being nonpercipitable when subjected to heat-sterilization, increased salt concentration or contact with organic solvents;

(c) fermenting the composition resulting from step (b) with a lactic acid or lactic acid salt-producing microorganism in a fermentation zone;

(d) continuously removing a product-containing broth from said zone, removing cells of said microorganism from said broth to form a cell-free product-containing stream and recycling said cells to said zone;

(e) contacting said cell-free product-containing stream at an acidic pH with a water-immiscible liquid consisting essentially of trialkyl tertiary amines of at least 24 carbon atoms and a water-immiscible organic solvent for a sufficient time and temperature, whereby lactic acid and lactic acid salt are extracted from said stream into a water-immiscible phase, said liquid characterized by a distribution coefficient in excess of 1.0 for lactic acid and lactic acid salt in said liquid versus water;

(f) separating said water-immiscible phase from the mixture formed in step (e);

(g) contacting said water-immiscible liquid from step (f) with a material selected from the group consisting of aqueous ammonium hydroxide, solid alkalis, solid alkaline earth

compounds, and aqueous non-homogenous suspensions of solid alkalis or solid alkaline earth compounds for a sufficient time and temperature, whereby lactic acid and lactic acid salt are removed from said water-immiscible phase.

4,698,304

METHOD FOR PRODUCING HYDROCARBON MIXTURES

Hideo Fukuda, Osaka; Takahira Ogawa, and Takao Fujii, both of Kumamoto, all of Japan, assignors to Hideo Fukuda, Osaka, Japan

Filed Oct. 8, 1985, Ser. No. 785,479
Claims priority, application Japan, Oct. 9, 1984, 59-211972
Int. Cl.[4] C12P *5/00, 5/02*
U.S. Cl. 435—166 **6 Claims**

1. A method for producing a hydrocarbon mixture which comprises cultivating aerobically a strain of microorganism capable of producing simultaneously at least two kinds of saturated or unsaturated C_2–C_5 hydrocarbons in a water-containing medium to thereby cause the formation of said hydrocarbons in the liquid phase or/and the gaseous ambience of the medium, recovering said hydrocarbons from said liquid or/and gaseous ambience, and separating said hydrocarbons.

4,698,305

METHOD OF TREATING WOOD

Göran Hansson, Oras 11, 242 00 Hörby, Sweden

Filed Sep. 20, 1984, Ser. No. 652,487
Claims priority, application Sweden, Sep. 20, 1983, 8305055
Int. Cl.[4] C12P *1/02;* **C12R** *1/645;* **C12N** *1/22, 1/14*
U.S. Cl. 435—171 **26 Claims**

1. A method of treating wood to effect zoning, comprising the steps of:

(a) pretreating the wood to disinfect the wood and to adjust the moisture content of the wood to a desired value;

(b) treating the wood to inhibit decomposition of the wood by fungus, while allowing fungus growth therein by impregnating the wood with a nutrient solution;

(c) inoculating the pretreated and treated wood with at least one fungus culture; and

(d) incubating the inoculated wood under controlled conditions to obtain zoning, in the substantial absence of decomposition of the wood.

4,698,306

PROCESS FOR PRODUCING PEROXIDASE

Satoko Noda, Kyoto, and Matsui Susumu, Ootsu, both of Japan, assignors to Takara Shuzo Co., Ltd., Kyoto, Japan

Filed Oct. 28, 1985, Ser. No. 792,731
Claims priority, application Japan, Nov. 28, 1984, 59-250900
Int. Cl.[4] C12N *9/08;* **C12Q** *1/28;* **C12R** *1/645*
U.S. Cl. 435—192 **2 Claims**

1. A process for producing peroxidase which comprises cultivating *Coprinus macrorhizus* K-1330 (FERM BP-648) in a culture medium and collecting the peroxidase produced from the resulting culture broth.

4,698,307

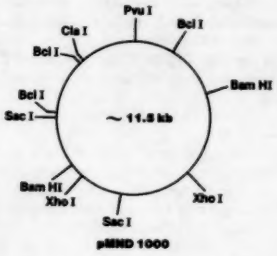
RECOMBINANT DNA CLONING VECTORS CONTAINING SELECTABLE GENETIC MARKERS FOR USE IN STREPTOMYCES AND RELATED ORGANISMS

James A. Mabe, and Walter M. Nakatsukasa, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Aug. 10, 1984, Ser. No. 639,631
Int. Cl.[4] C12N *1/20, 15/00, 1/0;* **C12P** *21/00, 19/34;* **C12R** *1/465, 1/485, 1/54;* **C07** *21/04*
U.S. Cl. 435—253 **24 Claims**

1. A recombinant DNA cloning vector comprising:

(a) a functional origin of replication-containing restriction fragment of plasmid pMND1000, and



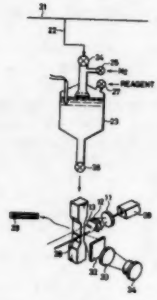
(b) one or more DNA segments that convey resistance to at least one antibiotic or that convey colorimetric sensitivity when transformed into a sensitive restrictionless host cell.

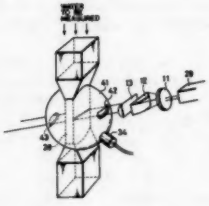
4,698,308

DEVICE FOR MEASURING THE NUMBER OF BACTERIA IN SUPERPURE WATER

Mitsuru Ikeda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 14, 1986, Ser. No. 829,387
Claims priority, application Japan, Feb. 14, 1985, 60-26706
Int. Cl.[4] C12M *1/34*
U.S. Cl. 435—291 **8 Claims**





1. A device for measuring the number of bacteria in superpure water, comprising:

means for conducting water under test including a measuring flow path;

means for adding a reagent to the water in said measuring flow path of a type such that products formed by reaction

of said reagent with bacteria fluoresce when exposed to an exciting light beam;

an exciting light source for applying an exciting light beam to said water in said measuring flow path to cause said reaction products to fluoresce;

a photoelectric converter receiving light produced when said products fluoresce;

means for differentiating an output of said photoelectric converter; and

means for counting an output of said differentiating means,

said measuring flow path being rectangular in section and having a small thickness in a direction of application of said exciting light beam and a large width perpendicular to a direction of said thickness, said exciting light beam being linearly applied in a widthwise direction of said measuring flow path.

5. A device for measuring the number of bacteria in superpure water, comprising:

means for conducting water under test including a measuring flow path;

means for adding a reagent to the water in said measuring flow path of a type such that products formed by reaction of said reagent with bacteria fluoresce when exposed to an exciting light beam;

an exciting light source for applying an exciting light beam to said water in said measuring flow path to cause said reaction products to fluoresce;

a photoelectric converter receiving light produced when said products fluoresce; and

a spherical mirror positioned to reflect with high efficiency fluorescent light produced by applying said exciting light beam to said water in said flow path to said photoelectric converter,

said measuring flow path being rectangular in section and having a small thickness in a direction of application of said exciting light beam and a large width perpendicular to a direction of said thickness, said exciting light beam being linearly applied in a widthwise direction of said measuring flow path.

4,698,309

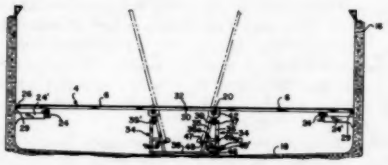
GERMINATION FLOOR SYSTEMS

Norman H. Andreasen, 1520 Norwood Ave., Itasca, Ill. 60143

Filed Dec. 31, 1984, Ser. No. 687,598

Int. Cl.[4] C12C *1/00, 1/06*; C12M *1/00*

U.S. Cl. 435—302 **16 Claims**



1. A germination floor apparatus comprising

floor means for carrying a load of grain;

said floor means consisting of a plurality of tray assemblies arranged in rows extending along the length of said floor means;

said tray assemblies comprising two rows defining the width of said floor means;

support means positioned beneath said plurality of tray assemblies for carrying said tray assemblies in an elevated position;

pivot means supported on said support means and carrying said tray assemblies in each of said two rows for pivotal movement about an axis extending along the length of each of said two rows,

said tray assemblies being movable about said axis in each of said two rows between a horizontal position for carrying the load of grain and an upright position to permit access to the under side of said floor means for cleaning;

said tray assemblies including pneumatic cylinder means or hand hold means to lift said tray assemblies to said upright position;

said pivot means includes an elongated tube extending along said axis in each of said two rows at a position beneath said tray assemblies;

said tray assemblies having inner edge portions and outer edge portions, said inner edge portions of adjacent pairs of tray assemblies in adjacent rows disposed in contacting relationship in said horizontal position, said outer edge portions defining the entire width of said floor means,

said inner edge portions being positioned beneath said axis in said upright position and said outer edge portions being lifted above said axis to permit access to said underside of said tray assembodies for cleaning.

4,698,310

APPARATUS FOR FERMENTATION OF ORGANIC MATERIAL

Bert S. Wikholm, Tullinge; Torsten L. T. Carlsson, Södertälje, and Ake R. Öster, Tumba, all of Sweden, assignors to Alfa-Laval AB, Tumba, Sweden

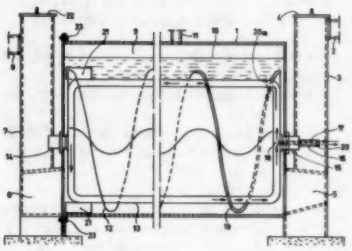
PCT No. PCT/SE82/00040, § 371 Date Sep. 28, 1982, § 102(e) Date Sep. 28, 1982, PCT Pub. No. WO82/02706, PCT Pub. Date Aug. 19, 1982

PCT Filed Feb. 11, 1982, Ser. No. 432,920

Claims priority, application Sweden, Feb. 11, 1981, 8100939

Int. Cl.[4] C12M *1/02, 1/00*; F28F *5/06*

U.S. Cl. 435—316 **6 Claims**



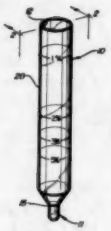
1. An apparatus for anaerobic digestion of organic material to produce methane gas and comprising a substantially rigid, horizontal cylindrical tank having a symmetrical axis, a horizontal transport screw, means for heating said screw internally for heat transfer, means mounting said screw for rotation about an axis located below said symmetrical axis of the tank, said tank having an inlet end portion provided with an inlet opening for organic material located below said rotation axis and at the lower portion of the tank, said tank also having an outlet end portion provided with an outlet opening at the lower portion of the tank, said screw having an outer peripheral portion adjacent the tank's bottom and operable to transport sludge along said bottom toward said outlet opening, said peripheral portion of the screw forming with at least one side of the tank an open space for recirculation of fermented material to said inlet end portion, said peripheral portion also forming with the upper part of the tank an accumulation space for evolved gas, said upper part of the tank having an outlet from said accumulation space, said heating means including a pipe frame, wherein the pipe frame mounts the screw and extends parallel to said rotation axis of the screw, and means providing a channel for conveying a heating medium to the pipe frame from outside the tank.

4,698,311

PARTICLE WASHING AND SEPARATION METHOD

Shelby J. Hall, Stewartsville; David J. Olekna, Annandale, and Donald M. Davies, Jr., Raritan, all of N.J., assignors to Ortho Diagnostic Systems Inc., Raritan, N.J.

Filed Oct. 30, 1985, Ser. No. 676,973
Int. Cl.[4] G01N *1/00*; B01D *33/02*; B04B *5/02*
U.S. Cl. 436—10 4 Claims



1. A process for preparing a standardized concentration of washed particles from a mother solution using a device comprising a tube having an open top end and a bottom end, there being a nipple-like receptacle having a predetermined volumetric capacity formed in said bottom end of said tube, said receptacle having an open top end and a closed bottom end, said tube and said receptacle having common inner walls, said inner wall of said bottom end of said tube funneling down towards the top end of said inner wall of said receptacle whereby, when a liquid suspension of particles is placed in said tube and said tube is subjected to centrifugation, said receptacle becomes packed with said particles, said process comprising the steps of:

providing said tube;

placing in said tube a preselected amount of said suspension of particles in said mother solution;

mixing a suitable amount of a wash fluid with said suspension;

centrifuging said tube and contents for a sufficiently long period to cause said particles to be washed and then to be packed into said receptacle;

stopping the centrifuge;

removing the contents of the tube above the packed particles in said receptacle without disturbing said packed particles;

adding a suspending fluid up to a predetermined level in said tube above said receptacle, and then mixing said packed particles into said suspending fluid so as to obtain a predetermined concentration thereof in the resultant suspension.

4,698,312

STABILIZING BLOOD CELLS WITH AROMATIC POLYALDEHYDE FOR USE IN HEMATOLOGY CONTROLS AND CALIBRATORS

Show-Chu Wong, West Nyack; Harbans S. Deol, Walden, and Debra L. Harz, Spring Valley, all of N.Y., assignors to Fisher Scientific Company, Pittsburgh, Pa.

Filed Jul. 28, 1986, Ser. No. 889,748
Int. Cl.[4] G01N *31/00*
U.S. Cl. 436—10 20 Claims

1. A method for preparing a stabilized cell component of a hematology control or calibrator by reacting blood cells with an aqueous aldehyde solution,

characterized by the aqueous aldehyde solution comprising:

(a) water,

(b) an aromatic polyaldehyde having carbonyls attached to aromatic ring carbons, and

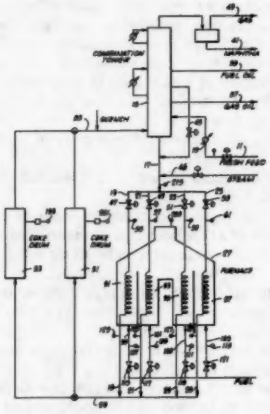
(c) an organic co-solvent in an amount miscible with water and sufficient to solubilize the aromatic polyaldehyde.

4,698,313

METHOD AND DEVICE FOR CONTROLLING A DELAYED COKER SYSTEM

William S. Stewart, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 7, 1986, Ser. No. 827,078
Int. Cl.[4] G01N *37/00*
U.S. Cl. 436—55 12 Claims



3. A method of controlling flow of hydrocarbon feed to a coke drum so as to optimize flow in a delayed coking process wherein the hydrocarbon feed is heated to coking temperature in a coil stream combustion furnace and combustion is controlled so as to produce a desired coking temperature, comprising:

(a) determining a first flow rate of hydrocarbon feed to said coke drum which will fill the coke drum to capacity in a cycle time;

(b) determining if flow of the hydrocarbon feed is causing a zone flooding condition in said combustion furnace and upon a zone flooding condition determining a second flow rate of hydrocarbon feed to said coke drum corresponding to this zone flooding condition;

(c) determining if the combustion furnace is in an air-limited condition and upon an air-limited condition determining a third flow rate of hydrocarbon feed to said coke drum corresponding to this air-limited condition; and

(d) automatically controlling the flow of hydrocarbon feed into said coke drum to flow at a feed rate which is not higher than the highest of said first, second and third flow rates.

9. A delayed coker system with a process control device for controlling the flow rate of hydrocarbon feed, comprising:

a coke drum to which a hydrocarbon feed is delivered at coking temperature and in which a coke product is formed, said coke drum having a predetermined maximum fill level;

first signal producing means connected to said coke drum for measuring the time for coke to fill said coke drum to a predetermined volume level and predicting thereby a first flow rate which will fill the coke drum to the predetermined maximum fill level in a predetermined coke drum cycle time, and producing a first flow rate signal proportional to said first flow rate;

a combustion furnace having multiple zones through each zone of which is conveyed a separate coil stream of hydrocarbon feed for heating of said stream to coking temperature, said furnace being connected to convey said hydrocarbon feed streams to said coke drum;

second signal producing means for determining if all of said zones are in a zone flooding condition and producing a second flow rate signal proportional to a second flow rate of hydrocarbon feed at which all of said zones are flooding;

an oxygen analyzer disposed on said combustion furnace for measuring excess oxygen in said combustion furnace;

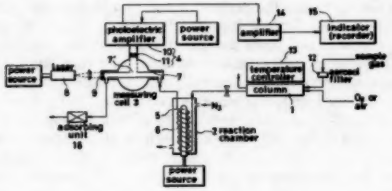
third signal producing means connected to said oxygen analyzer for determining if excess oxygen in said combustion furnace is below a predetermined level such that the heating ability of said furnace is in an air-limited condition and for producing a third flow rate signal proportional to a third flow rate of hydrocarbon feed to said coke drum corresponding to this the air limited condition; and

a coke feed control means connected to said first, second and third signal producing means for automatically controlling the flow of said hydrocarbon feed to said coke drum responsive to said first, second and third flow rate signals such that the flow of said hydrocarbon feed is maintained at the lowest of said first, second and third flow rates.

4,698,314
METHOD FOR MEASUREMENT OF GAS CONCENTRATION

Hiroaki Tao, Ibaraki, Japan, assignor to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 797,864
Claims priority, application Japan, Nov. 14, 1984, 59-240300
Int. Cl.[4] G01N *21/47, 33/20*
U.S. Cl. 436—171 **2 Claims**



1. A gas concentration measuring method comprising the steps of:

irradiating a sample gas containing trace amounts of a gas subjected to detection and capable of photochemically forming light-scattering oxide particles, exposing said sample gas to a photochemical intensity level of ultraviolet light in the presence of oxygen in a concentration of 20 to 100 percent at a temperature in the range of from normal room temperature to 60 degrees Centigrade, thereby forming fine oxide particles of the gas subjected to detection,

irradiating the sample gas having the fine oxide particles contained therein with light, and

detecting scattered light emitted by the fine oxide particles.

4,698,315
METHOD AND KIT FOR DETERMINING TOTAL DIGOXIN LEVELS INVOLVING AGENT TO DISSOCIATE DIGOXIN-PROTEIN COMPLEX

Bruce C. Farrenkopf, Clifton, and Richard A. Kaufman, Belleville, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

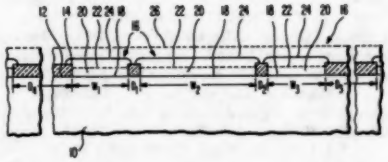
Filed Apr. 22, 1985, Ser. No. 726,255
Int. Cl.[4] G01N *33/53, 33/533, 33/536, 33/542*
U.S. Cl. 436—536 **11 Claims**

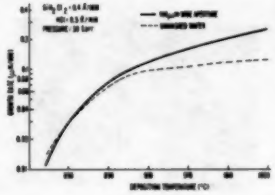
1. A method for determining total digoxin levels in a biological fluid sample containing digoxin-protein complex which method comprises disrupting the digoxin-protein complex by treating said sample solution with an effective amount of a dissociation agent selected from one or more members of the group consisting of a C_3–C_{26} saturated or unsaturated fatty acid, a C_{2-7} lower alkanol, quinidine and α-tocopherol so as to release the bound digoxin from serum protein, passing the treated sample solution through a centrifugal ultrafilter so as to selectively pass digoxin containing sample solution through said filter and retaining said serum proteins and determining the digoxin contents in said sample solution in a fluorescence polarization assay.

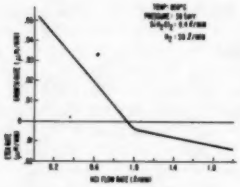
4,698,316
METHOD OF DEPOSITING UNIFORMLY THICK SELECTIVE EPITAXIAL SILICON

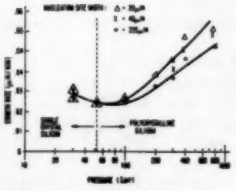
John F. Corboy, Jr., East Amwell Township, Hunterdon County; Robert H. Pagliaro, Jr., Ewing Township, Mercer County; Lubomir L. Jastrzebski, Plainsboro, and Ramazan Soydan, Berkley Township, Ocean County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 694,100, Jan. 23, 1985, Pat. No. 4,592,792. This application Nov. 29, 1985, Ser. No. 802,994
Int. Cl.[4] H01L *21/205, 21/76*
U.S. Cl. 437—89 **5 Claims**









1. A method for depositing monocrystalline silicon, at a uniform rate, onto a plurality of unequally sized monocrystalline nucleation sites comprising:

providing a substrate having an apertured oxide mask on a major surface thereof, the oxide mask including a plurality of apertures therethrough, each aperture exposing a nucleation site on the substrate surface; and

exposing the substrate to a mixture of dichlorosilane and hydrogen chloride at 850° C. and at a pressure less than approximately 50 torr, for a predetermined time, so as to yield a monocrystalline silicon island extending from each nucleation site, all islands being equal in thickness and each having a substantially flat profile across the major surface thereof.

4,698,317

POROUS CORDIERITE CERAMICS, A PROCESS FOR PRODUCING SAME AND USE OF THE POROUS CORDIERITE CERAMICS

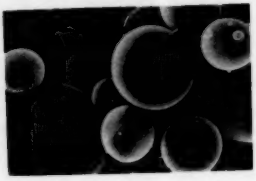
Senya Inoue, Saitama; Akira Ono, Tokyo; Mikio Kobayashi, Saitama, and Hiroshi Yokoo, Tokyo, all of Japan, assignors to Kanto Kagaku Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 23, 1985, Ser. No. 726,325

Claims priority, application Japan, Apr. 24, 1984, 59-81180; Apr. 24, 1984, 59-81181; Dec. 21, 1984, 59-268442

Int. Cl.[4] C03C *10/08, 12/00;* **C04B** *38/06*

U.S. Cl. 501—9 **19 Claims**



1. A hollow spherical cordierite glass powder with a shell devoid of any pores or provided with a few or an abundance of open pores, which has been formed by the process which comprises providing a starting solution containing in an organic or aqueous organic solvent an alkyl silicate and aluminum and magnesium salts soluble in the organic solvent in a proportion of 44–65% by weight, 25–43% by weight and 10–16% by weight in terms of SiO_2, Al_2O_3 and MgO, respectively, and subjecting said starting solution to spray thermal decomposition in the presence of an oxidizing gas to produce said hollow spherical cordierite glass powder.

8. A process for preparing a porous cordierite ceramic having an interconnecting open cellular structure which comprises:

(a) providing a starting solution containing in an organic or aqueous organic solvent an alkyl silicate and aluminum and magnesium salts soluble in said organic solvent in a proportion of 44–65% by weight, 25–43% by weight and 10–16% by weight in terms of SiO_2, Al_2O_3 and MgO, respectively,

(b) subjecting said starting solution to spray thermal decomposition in the presence of an oxidizing gas to form a hollow microspherical cordierite glass powder,

(c) processing said glass powder to a shaped body after an optional heat treatment, and

(d) firing said shaped body.

4,698,318

PHOSPHATE GLASS CERAMIC FOR BIOLOGICAL AND MEDICAL APPLICATIONS

Jürgen Vogel; Wolfram Höland, both of Jena-Lobeda, and Werner Vogel, Jena, all of German Democratic Rep., assignors to VEB Jenaer Glaswerk, Jena, German Democratic Rep.

Filed Nov. 1, 1984, Ser. No. 667,038

Claims priority, application German Democratic Rep., Jan. 24, 1984, 2595611

Int. Cl.[4] C03C *10/02, 3/17*

U.S. Cl. 501—10 **14 Claims**

8. a biologically active phosphate glass ceramic for application as hard tissue or bone replacement or implant material which comprises a phosphate glass ceramic consisting essentially of

Al_2O_3	3–21% by mass,
CaO	8–26% by mass,
R_2O	12–25% by mass,
P_2O_5	43–58% by mass,
TiO_2	0–10% by mass,
F^-	0–7% by mass,
FeO	0–6% by mass,
Fe_2O_3	0–5% by mass,
MgO	0–6% by mass,

wherein the 12–25% by mass R_2O is selected from the group consisting of 12% to 25% by mass of Na_2O, 12% to 18% by mass of K_2O, and 12% to 25% Na_2O and K_2O together wherein the K_2O content does not exceed 18% by mass and containing in addition to the glass phase the main crystal phases apatite and aluminiumorthophosphate of at least one of the tridymite form and the berlinite form, said biologically active phosphate glass ceramic having adjustable biologically active characteristics and being capable of being utilized for biological applications as a compact material, as a thin layer, or in granulated form, said biologically active phosphate glass ceramic having a SiO_2 content no greater than 7% by mass, and having good biological compatibility with hard tissue or bone, so that said biologically active phosphate glass ceramic, when implanted, is capable of an optimal union, free of connecting tissues, between bone or hard tissue and said phosphate glass ceramic.

4,698,319

DENSIFIED COMPOSITE CONTAINING ONE OR MORE INTERWOVEN MATRIX COMPOSITIONS

Siba P. Ray, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 604,913, Apr. 27, 1984, which is a continuation-in-part of Ser. No. 423,673, Sep. 27, 1982, Pat. No. 4,454,015. This application Oct. 21, 1985, Ser. No. 789,434

Int. Cl.[4] C04B *35/56, 35/58, 35/10*

U.S. Cl. 501—87 **5 Claims**

1. A method of forming a densified composite which comprises:

(a) forming a mixture of reactants capable of reacting to form at least two substantially interwoven matrix compositions, each of said interwoven matrix compositions consisting essentially of a refractory hard metal and a meal compound formed by reacting together:

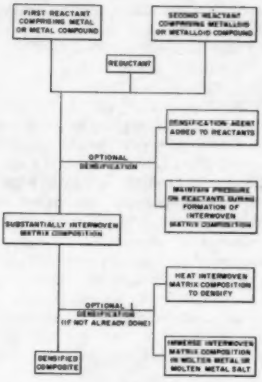
(1) a first reactant selected from the group consisting of a metal; and oxides, carbides, nitrides, and silicides of metals;

(2) a second reactant consisting of a metalloid selected from the group consisting of boron, nitrogen, carbon, silicon, and sulfur; or a compound formed from such a metalloid; and

(3) a third reactant consisting of a reductant selected from the group consisting of Al, Mg, Ca, and Ba which simsutaneously oxidizes to form said metal compound;

(b) pressing said reactants together at a pressure of from 1000 to 25,000 psi; and

(c) maintaining said pressure on said reactants while reacting said mixture to form said interwoven matrix compositions;


FIRST REACTANT COMPRISING METAL OR METAL COMPOUND
SECOND REACTANT COMPRISING METALLOID OR METALLOID COMPOUND
REACTANT
DENSIFICATION AGENT ADDED TO REACTANTS
OPTIONAL DENSIFICATION
MAINTAIN PRESSURE ON REACTANTS DURING FORMATION OF INTERWOVEN MATRIX COMPOSITION
SUBSTANTIALLY INTERWOVEN MATRIX COMPOSITION
HEAT INTERWOVEN MATRIX COMPOSITION TO DENSIFY
OPTIONAL DENSIFICATION (IF NOT ALREADY DONE)
IMMERSE INTERWOVEN MATRIX COMPOSITION IN MOLTEN METAL OR MOLTEN METAL SALT
DENSIFIED COMPOSITE

whereby said interwoven matrix compsitions will be sufficiently denisified to form a densified composite having a density of at least 90% of the calculated theoretical density.

4,698,320

ALUMINUM NITRIDE SINTERED BODY

Mituo Kasori, Kawasaki; Kazuo Shinozaki; Kazuo Anzai, both of Tokyo, and Takeshi Takano, Samukawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jan. 30, 1985, Ser. No. 696,435

Claims priority, application Japan, Jun. 26, 1984, 59-130106; Jun. 26, 1984, 59-130113

Int. Cl.[4] C04B *35/58*

U.S. Cl. 501—96 **16 Claims**

1. An aluminum nitride sintered body prepared by a process comprising the steps of (1) providing a mixture which consists essentially of aluminum nitride and a sintering aid which consists essentially of at least one fluoride of an alkaline earth metal selected from the group consisting of calcium, strontium and barium or at least one fluoride of a rare earth in an amount of 0.01 to 20% by weight, based on the total amount of said component; and (2) sintering said mixture to produce an aluminum nitride sintered body having a thermal conductivity of at least about 40 W/m.k.

4,698,321

REGENERATION OF HDS CATALYSTS

Allan S. Myerson, Brooklyn, N.Y., and William R. Ernst, Roswell, Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Continuation-in-part of Ser. No. 517,027, Jul. 25, 1983, Pat. No. 4,559,313, which is a continuation-in-part of Ser. No. 313,458, Oct. 21, 1981, abandoned. This application Aug. 8, 1985, Ser. No. 763,514

The portion of the term of this patent subsequent to Dec. 17, 2002, has been disclaimed.

Int. Cl.[4] B01J *23/94, 21/20, 38/64;* **C10G** *45/08*

U.S. Cl. 502—25 **13 Claims**

1. In a method for regenerating a spent HDS catalyst having an alumina support by removing contaminating nickel and vanadium compounds therefrom while increasing the BET surface area and the pore diameter thereof to attain a porosity effective to allow the regenerated HDS catalyst to be reused as HDS catalyst, the steps of:

(a) sulfiding the spend HDS catalyst by passing a total amount of hydrogen sulfide of at least about 60 cm^3 per gram of spent HDS catalyst through the spent catalyst under elevated temperature selected in the range of about 400° C. to about 700° C. to obtain, after leaching, the increased BET surface area;

(b) leaching the spent HDS catalyst obtained from step (a) in an acidic aqueous ferric ion containing solution at a temperature and for a time sufficient to remove an effective amount of the vanadium and nickel therefrom while increasing the pore diameter of the HDS catalyst; and

(c) recovering regenerated catalyst from step (b) having porosity effective to allow the regenerated HDS catalyst to be reused.

9. The method of regenerating HDS catalysts having an alumina substrate and containing molybdenum oxide and an oxide of a metal selected from the group consisting of cobalt, tungsten and nickel as active catalytic components thereof, which HDS catalyst has become deactivated by contamination with vanadium and nickel compounds with consequent reduction in the BET surface area of the spent HDS catalyst, which includes the steps of:

(a) sulfiding the deactivated HDS catalyst at elevated temperature in preparation for leaching contaminating nickel and vanadium therefrom to regenerate the spent HDS catalyst;

(b) leaching the sulfided deactivated HDS catalyst of step (a) in an acidic aqueous leaching solution containing ferric ions to solubilize the contaminating nickel and vanadium compounds which have become sulfided in step (a);

(c) recovering regenerated HDS catalyst from the leaching solution of step (b); and wherein

step (a) is controlled to increase the BET surface area of the regenerated catalyst recovered in step (c) substantially as compared with the BET surface area of the deactivated HDS catalyst by controlling the temperature of step (a) to a temperature within the range of about 400° C. to not more than about 700° C.

10. The method as defined in claim 9 including the step of calcining the deactivated HDS catalyst at a temperature of about 400° C. prior to the sulfiding of step (a).

4,698,322

HIGHLY ACTIVE AND HIGHLY SELECTIVE AROMATIZATION CATALYST

Donald S. Santilli, Novato; John J. Long, Suisun City, and Robert T. Lewis, Albany, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Apr. 17, 1985, Ser. No. 724,145

Int. Cl.[4] B01J *29/30, 29/08*

U.S. Cl. 502—74 **7 Claims**

1. A reforming catalyst comprising an L zeolite containing platinum metal and at least one promoter metal selected from the group consisting of iron, cobalt, titanium, and rare earth metal wherein said catalyst has a platinum to promoter metal mole ratio of less than 10:1.

3. A method of preparing the reforming catalyst of claim 1, comprising steps of:

(a) forming an aqueous solution of alkali hydroxide, aluminum hydroxide, and ferric salt;

(b) combining said solution with an aqueous solution of silica to form a thickening gel in a mother liquor;

(c) heating said thickening gel to form an L zeolite;

(d) cooling said gel containing said L zeolite;

(e) decanting the mother liquor from said gel;

(f) filtering said L zeolite from said gel;

(g) washing said filtered L zeolite;

(h) drying said washed L zeolite;

(i) adding platinum to said dried L zeolite to form a catalyst;

(j) drying said catalyst; and

(k) calcining said dried catalyst.

4,698,323

TRANSITION METAL CATALYST COMPONENT CONTAINING MAGNESIUM ALKOXY ALKOXIDES

Elliot I. Band, North Tarrytown, and William E. Summers, III, Peekskill, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Sep. 29, 1986, Ser. No. 912,298
Int. Cl.[4] C08F 4/64
U.S. Cl. 502—133 3 Claims

1. A process for forming a transition metal polymerization catalyst component comprising reacting (i) a soluble magnesium alkoxy alkoxide, solubilized in organic solvent, represented by the formula:

$$(Z-(CH_2)_n-O)-Mg-(O-(CH_2)_m-OR_2)$$

wherein n and m are the same or different positive integers from 1 to 12; Z is (R_1O)— or (R_1)—, and R_1 and R_2 are the same or different hydrocarbon radicals containing 1 to 20 carbon atoms; with (ii) titanium tetrachloride, wherein the mole ratio of (i) to (ii) is from 1:5 to 1:1000.

4,698,324

METHOD FOR MANUFACTURE OF CATALYST COMPOSITE HAVING GOLD OR MIXTURE OF GOLD WITH CATALYTIC METAL OXIDE DEPOSITED ON CARRIER

Masatake Haruta, Kawanishi; Hiroshi Sano, Toyonaka, and Tetsuhiko Kobayashi, Ikeda, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Aug. 21, 1986, Ser. No. 898,945
Int. Cl.[4] B01J 23/52, 23/68, 23/72, 23/74
U.S. Cl. 502—243 14 Claims

1. A method for manufacturing a catalyst composite having gold deposited on a carrier, which comprises:

(a) immersing a carrier in an aqueous solution of a mixture consisting of a water-soluble salt of gold and at least one member selected from the group consisting of urea and acetamide, thereby causing precipitation of gold or a precursor of gold or a combination thereof, and deposition thereof on the surface of the carrier; and

(b) firing said carrier having said precipitate deposited thereon, and wherein the concentration of said water-soluble salt of gold in said aqueous solution is in the range of 5×10^{-3}M to 5×10^{-1}M and the concentrations of urea and acetamide therein are each in the range of 1.5 to 20 times the stoichiometric amount required for causing precipitation of metallic ions in said aqueous solution.

4,698,325

CATALYSTS FOR AMMONIA SYNTHESIS

Sydney P. S. Andrew, Hartlepool, and James R. Jennings, Yarm, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Apr. 16, 1986, Ser. No. 852,703
Claims priority, application United Kingdom, Apr. 22, 1985, 8510197
Int. Cl.[4] B01J 21/04, 21/18, 23/78
U.S. Cl. 502—330 10 Claims

1. An ammonia synthesis catalyst precursor having a BET surface area of at least 10 $m^2.g^{-1}$ comprising an intimate mixture of finely divided particles of a reducible compound of at least one metal from Group VIII of the Periodic Table and finely divided particles of carbon and/or at least one stabilising, difficultly reducible, oxidic material, and containing an alkali metal compound as an activity promoter, characterised in that said alkali metal compound is an alkali metal salt of at least one acid containing a metal of Groups VA, VIA, VIIA or VIII of the Periodic Table.

4,698,326

COMPOSITION AND METHOD FOR OSSEOUS REPAIR

John J. Sauk, Ellicott, Md., and Craig L. Van Kampen, Oakdale, Minn., assignors to Regents of the University of Minnesota, Minneapolis and Minnesota Mining and Manufacturing Company, St. Paul, both of, Minn.

Filed Dec. 20, 1985, Ser. No. 811,677
Int. Cl.[4] A61K 37/16
U.S. Cl. 514—7 13 Claims

1. A composition for osseous repair which is prepared by a process comprising mixing a phosphophoryn calcium salt and type I collagen in a ratio of the phosphophoryn calcium salt to the type I collagen of about 3.0–0.1:1 to yield a solid composition which is effective to promote new bone formation upon introduction of the composition into osseous defects.

8. An osseous repair implant which is prepared by a process comprising introducing an amount of a solid composition containing an amount of a phosphophoryn calcium salt effective to promote new bone formation in an osseous defect having an exposed surface so that said composition presents a surface opposing and conformed to the exposed surface of said defect.

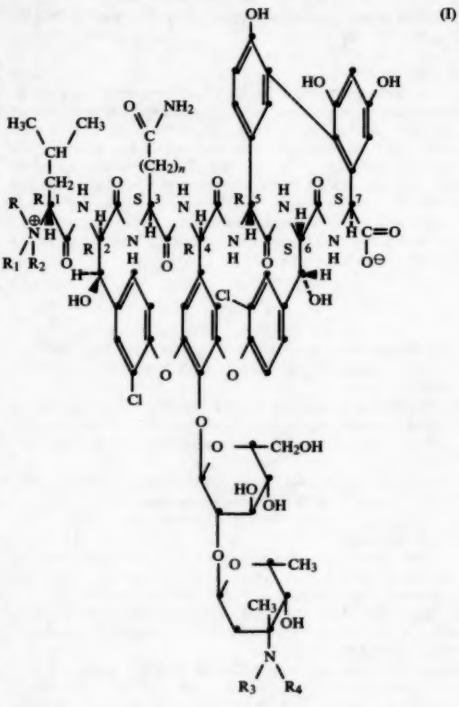
4,698,327

NOVEL GLYCOPEPTIDE DERIVATIVES

Ramakrishnan Nagarajan, and Amelia A. Schabel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 726,731, Apr. 25, 1985, abandoned. This application Apr. 18, 1986, Ser. No. 853,583
Int. Cl.[4] A61K 35/66, 37/02; C07K 7/50, 9/00
U.S. Cl. 514—8 20 Claims

1. A compound of formula (I):



wherein

R is hydrogen or methyl;
n is 1 or 2; and
(i) R_1 is hydrogen or methyl;
R_2 and R_3, independently, are hydrogen or a group of the formula: R_6R_7CH—;
R_6 and R_7 are independently R_5, R_5—(C_1–C_5-alkyl) or R_5—(C_2–C_5-alkenyl);
R_5 is hydrogen, C_1–C_{10}-alkyl, C_2–C_{10}-alkenyl, C_1–C_4 alkoxy, C_3–C_{10}-cycloalkyl, C_5–C_{12}-cycloalkenyl, phenyl, naphththhyl, indenyl, tetralinyl, decalinyl, adamantyl, a monocyclic heterocyclic ring system comprising 3 to 8 atoms in the ring or a bicyclic heterocyclic ring system comprising 6 to 11 atoms, provided that at least one atom of the ring system is carbon and at least one atom of the ring system is a heteroatom selected from O, N and S, and R_5 may be substituted with one or more hydroxy, nitro, C_1–C_{10}-alkoxy, C_1–C_{10} alkyl, phenyl, C_1–C_6-alkylthio, nitrile, halo, C_2–C_4 acylamino, amino, C_1–C_4 dialkylamino groups; and
R_4 is hydrogen; or
(ii) R_1 and R_2 and/or R_3 and R_4 together form a group of the formula

provided that: (1) at least one of R_2 and R_3 must be other than hydrogen; (2) when n is 2, R must be hydrogen; (3) when R is methyl and R_3 is hydrogen, R_2 cannot be methyl and (4) when R and R_1 are both methyl, then R_2 is hydrogen or methyl and n is 1;
or a salt thereof.

4,698,328

METHOD OF INCREASING BONE MASS

Robert M. Neer, Cambridge; John T. Potts, Jr., and David M. Slovik, both of Newton, all of Mass., assignors to The General Hospital Corporation, Boston, Mass.

Continuation of Ser. No. 720,018, Apr. 4, 1985, abandoned. This application Dec. 5, 1986, Ser. No. 939,308
Int. Cl.[4] A61K *37/36*
U.S. Cl. 514—12 **31 Claims**

1. A method of increasing bone mass in a human, which comprises:
administering to said human a physiologically active parathyroid hormone or physiologically active fragment thereof, in combination with an agent selected from the group consisting of:
(a) a hydroxylated Vitamin D compound, and
(b) a dietary calcium supplement.

4,698,329

NEW RENIN-INHIBITORY PEPTIDES AND THEIR USE

Rei Matsueda; Yuichiro Yabe; Mitsuo Yamazaki, all of Tokyo; Tatsuo Kokubu, and Kunio Hiwada, both of Ehime, all of Japan, assignors to Sankyo Company, Limited, Tokyo, Japan

Filed Jan. 30, 1985, Ser. No. 696,334
Claims priority, application Japan, Feb. 3, 1984, 59-19100
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[4] A61K *37/64*; C07K *5/08*
U.S. Cl. 514—18 **23 Claims**

1. A compound of the formula (I):

$$R^1CO—NH—CH(R^2)—CONH—CH(R^3)—X \quad (I)$$

wherein:
R^1 represents a group of formula R^{13}—$CH(NHR^{12})$— in which:
R^{12} represents a 2-(2-methoxyethoxy)ethoxycarbonyl, benzyloxycarbonyl, p-methoxybenzyloxycarbonyl, t-butoxycarbonyl, 9-fluorenylmethoxycarbonyl, 4-phenylbutyryl or 3-(3-nitropyrid-2-yldithio)propionyl,
R^{13} represents a benzyl group, a benzyl group having at least one substituent selected from the group consisting of C_1–C_4 alkyl groups and C_1–C_4 alkoxy groups, a 1-naphthylmethyl group, a 3-indolylmethyl group, a 5-quinolymethyl group, a 4-quinolylmethyl group, a 2-pyridylmethyl group, a 3-pyridylmethyl group or a 4-pyridylmethyl group;
R^2 represents a C_1–C_{10} alkyl group, an allyl group, a propargyl group, a cyclopropylmethyl group, a cyclopentylmethyl group, a cyclohexylmethyl group, a benzyl group, a 3-indolylmethyl group, a 2-thienylmethyl group, a 4-thiazolylmethyl group, a 2-thiazolylmethyl group, a 4-methyl-5-thiazolylmethyl group, a 2-, 3- and 4-pyridylmethyl group or a 4-imidazolylmethyl group;
R^3 represents an isobutyl, sec-butyl, cyclopropylmethyl, cyclopentylmethyl, or cyclohexylmethyl group;
X represents a group of —$CH(A—R^4)OH$, in which: A represents a single bond or an alkylene group;
R^4 represents a protected carboxy group, a carbamoyl group, an N-substituted carbamoyl group, a carbazoyl group, an N-substituted carbazoyl group or an acyl group; provided that, when A represents an alkylene group and when R^2 represents a 4-imidazolylmethyl group, R^4 does not represent a carbamoyl group or formyl group; and pharmaceutically acceptable salts thereof.

4,698,330

SOMNOGENIC COMPOSITIONS AND METHOD OF USE

James M. Krueger, Highland Park, Ill.; John R. Pappenheimer; Manfred L. Karnovsky, both of Cambridge, Mass.; Pierre Lefrancier, Bures sur Yvette, France; Jean Choay; Louis Chedid, both of Paris, France, and Edgar Lederer, Sceaux, France, assignors to President & Fellows of Harvard College, Cambridge, Mass.

Filed Jun. 27, 1983, Ser. No. 508,482
Int. Cl.[4] A61K *37/02*
U.S. Cl. 514—19 **13 Claims**

1. A method for inducing natural sleep of the slow-wave type in a primate which comprises administering orally to a primate in need thereof in an amount sufficient to induce sleep of the slow-wave type, a biological somnogenic composition which comprises a biologically acceptable carrier, and a sleep-inducing muramyl peptide selected from the following;
(1) N-acetylmuramyl-L-alanyl-D-glutamic acid,
(2) N-acetylmuramyl-L-alanyl-D-glutamine,
(3) N-acetylmuramyl-L-alanyl-D-gamma methoxy isoglutamine,
(4) N-acetylmuramyl-L-alanyl-D-alpha methoxy glutamic acid,
(5) N-acetylmuramyl-L-alanyl-D-alpha, gamma dimethoxy glutamic acid,
(6) N-acetylmuramyl-L-alanyl-D-isoglutamyl-L-methoxytyrosine,
(7) N-acetylmuramyl-L-alanyl-gamma-D-glutamyl meso diaminopimelic-D-alanyl-D-alanine,
(8) N-acetyl-glucosaminyl-(1,4)-N-acetyl muramyl-L-alanyl-D-isoglutamine,
inducing sleep of the slow-wave type while retaining the REM and NREM episodic nature of natural sleep, and increasing the number of sleep episodes in said primate.

4,698,331

2,3-DIAMINO-2,3-DIDESOXYHEXOSE DERIVATIVES AND THEIR USE

Ingolf Macher, and Frank M. Unger, both of Vienna, Austria, assignors to Sandoz Ltd., Basel, Switzerland

PCT No. PCT/EP85/00171, § 371 Date Dec. 18, 1985, § 102(e) Date Dec. 18, 1985, PCT Pub. No. WO85/04881, PCT Pub. Date Nov. 7, 1985

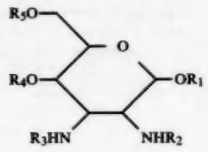
PCT Filed Apr. 17, 1985, Ser. No. 815,097

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1984, 3415102; Apr. 21, 1984, 3415100

Int. Cl.[4] A61K *31/70*; C07H *5/06*

U.S. Cl. 514—25 **9 Claims**

1. A compound of formula I



I

wherein

R_2 and R_3 are the same or different and each represent a C_{4-20} alkylcarbonyl group or a C_{4-20} alkylcarbonyl group substituted by OH, acetoxy or a C_{4-20} alkylcarbonyloxy group,

and

(a) R_1 represents halogen, lower alkyl, aralkyl or the phosphate, pyrophosphate, phosphorylethanolamine or or pyrophosphorylethanolamine group, R_4 represents hydrogen, the phosphate, pryophosphate, phosphorylethanolamine or pyrophosphorylethanolamine group and R_5 represents hydrogen or a glycosyl radical, provided at least one of R_1 and R_4 is other than hydrogen,

or

(b) R_1 represents hydrogen, lower alkyl or aralkyl and R_4 and R_5 represent hydrogen

in free form or, when at least one of R_1 and R_4 represents a phosphorus bearing group with a hydroxy, in the form of salts or esters.

9. A pharmaceutical composition useful as an immunostimulant containing an immunostimulant effective amount of a compound of formula I according to claim 1 in free form or in the form of a pharmaceutically acceptable salt or ester and a pharmaceutically acceptable diluent or carrier therefor.

4,698,332

EXPECTORANT

Sadanori Ogasawara, Tokorozawa; Takashi Hanafusa, Tokyo; Katsuhide Kariya, Tokorozawa; Masayoshi Ito, Kunitachi, and Yoshiyasu Shitori, Tokyo, all of Japan, assignors to Mect Corporation, Tokyo, Japan

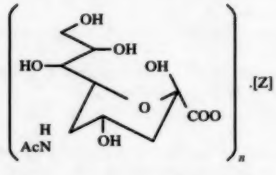
Filed Sep. 6, 1985, Ser. No. 773,036

Claims priority, application Japan, Sep. 11, 1984, 59-189950

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—42 **8 Claims**

1. An expectorant, comprising an effective amount of the compound of the formula I



wherein, n=1 or 2, and on condition of n=1, Z represents hydrogen, lithium, potassium, sodium, ammonium, organic ammonium or organic amine, whereas on condition of n=2, Z represents calcium, barium or magnesium, together with a pharmaceutically acceptable carrier in a powdered form suitable for aerosol application.

4,698,333

USE OF SUBSTITUTED MALONIC ACID DERIVATIVES AS AGENTS FOR COMBATING PESTS

Rudolf Fauss, Cologne; Reinhard Lantzsch, Leverkusen; Kurt Findeisen, Odenthal; Gerhard Jäger, Leverkusen; Ingeborg Hammann, Muelheim; Benedikt Becker, Mettmann, and Bernhard Homeyer, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 28, 1983, Ser. No. 546,687

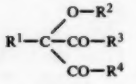
Claims priority, application Fed. Rep. of Germany, Nov. 10, 1982, 3241512

The portion of the term of this patent subsequent to Feb. 7, 2001, has been disclaimed.

Int. Cl.[4] A01N *37/20*

U.S. Cl. 514—63 **8 Claims**

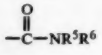
1. An agent for combating pests, wherein said agent contains a substituted malonic acid derivative of the formula



wherein

R^1 represents phenyl, which is mono-, di- or trisubstituted in the 3-, 4- and 5-positions by identical or different halogen atoms,

R^2 is hydrogen, C_{1-4}-alkyl, optionally halogen-substituted C_{1-4}-alkylaminosulphonyl, C_{1-4}-alkylcarbonyl, optionally halogen-substituted phenylcarbonyl, phenylsulphenyl, C_{1-4}-alkylsulphenyl, trialkylsilyl or



wherein

R^5 stands for hydrogen and

R^6 is optionally halogen-substituted phenyl or phenylcarbonyl, or C_{1-4}-alkyl or C_{1-4}-alkylcarbonyl and

R^3 and R^4 each independently is amino, trimethylsilylamino, formylamino, C_{1-4}-alkylcarbonyl-amino, alkylamino, trialkylsilylalkylamino,

both radical R^3 and R^4 only representing amino if R^2 is other than hydrogen.

4,698,334

FUNGICIDAL COMPOSITIONS BASED ON ALKYL PHOSPHITES

Daniel Horriere, Fontaines S/Saone, and Maurice Chazalet, Anse, both of France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

Continuation-in-part of Ser. No. 133,143, Mar. 24, 1980, abandoned, which is a continuation of Ser. No. 869,234, Jan. 13, 1978, abandoned. This application Mar. 12, 1982, Ser. No. 357,567

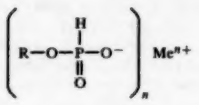
Claims priority, application France, Jan. 14, 1977, 77 01639

Int. Cl.[4] A01N *43/38, 57/18, 59/20*

U.S. Cl. 514—141 **19 Claims**

1. A fungicidal composition for the protection of vines against fungus diseases, which comprises as the active material a mixture of:

1 part by weight of a monoester salt of a phosphorous acid of the formula



in which
R is an alkyl radical having 2 to 4 carbon atoms,
Me is an alkali metal, alkaline earth, or aluminum atom and
n is a whole number from 1 to 3 equal to the valence of Me
and from about 0.2 to 0.5 parts of at least one phthalimide contact fungicide selected from the group consisting of N-(1,1,2,2-tetrachloroethylthio)-1,2,3,6-tetrahydrophthalimide and N-(trichloromethylthio)-phthalimide.

4,698,335

PROCESS FOR TREATING A WARM-BLOODED ANIMAL TO BE SUBJECTED TO RADIOTHERAPY

Charles R. Spillert, West Orange, N.J.; Corinne Devereux, Bronxville, N.Y., and Eric J. Lazaro, Jersey City, N.J., assignors to University of Medicine & Dentistry of New Jersey, Newark, N.J.

Filed Sep. 27, 1984, Ser. No. 655,227
Int. Cl.[4] A61K *31/635*
U.S. Cl. 514—158 **6 Claims**

1. A process for reducing tissue damage due to radiotherapy in a warm-blooded animal to be subjected to such therapy comprising administering to said warm-blooded animal (a) at least one member selected from the group consisting of 5-methyl-3-sulfanilamidoisoxazole and a salt of 5-methyl-3-sulfanilamidoisoxazole with a pharmaceutically acceptable base, and (b) at least one member selected from the group consisting of 2,4-diamino-5-(3,4,5-trimethoxybenzyl) pyrimidine and a salt of 2,4-diamino-5-(3,4,5-trimethoxybenzyl) pyrimidine with a pharmaceutically acceptable acid, said (a) and (b) being administered in an amount effective to reduce tissue damage.

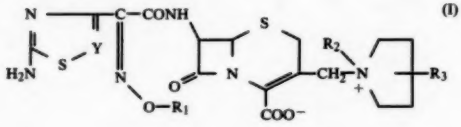
4,698,336

3-(PYRROLIDINIO)METHYL-3-CEPHEM DERIVATIVES

Isao Saito; Seiichiro Nomoto; Takashi Kamiya; Hiroshi Yamauchi; Isao Sugiyama; Yoshimasa Machida, and Shigeto Negi, all of Ibaraki, Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1986, Ser. No. 821,914
Claims priority, application Japan, Jan. 30, 1985, 60-14529; Jan. 30, 1985, 60-14530
Int. Cl.[4] A61K *31/545*; C07D *501/46*
U.S. Cl. 514—202 **7 Claims**

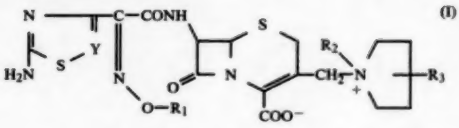
1. 3-(Pyrrolidinio)methyl-3-cephem compound of the formula:



(I)

wherein Y stands for a nitrogen atom, R_1 and R_2 are the same or different, and represent a lower alkyl group, R_3 denotes a hydroxy-substituted lower alkyl group, a lower alkyl group, or carbamoyl group, or a pharmaceutically acceptable acid addition salt thereof.

7. An antibacterial composition comprising a pharmaceutically acceptable amount of a compound represented by the formula:



(I)

wherein Y represents a nitrogen atom, R_1 and R_2 are the same or different, and represent a lower alkyl group, R_3 denotes a hydroxy-substituted lower alkyl group, a lower alkyl group, or a carbamoyl group, or a pharmaceutically acceptable acid addition salt thereof, together with a pharmaceutically acceptable carrier or excipient.

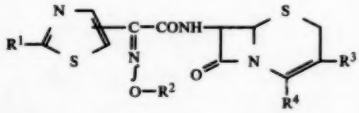
4,698,337

CEPHEM COMPOUNDS AND PROCESSES FOR PREPARATION THEREOF

Takao Takaya, Kawanishi; Hisashi Takasugi; Kiyoshi Tsuji, and Toshiyuki Chiba, both of Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Continuation of Ser. No. 715,400, Mar. 25, 1985, abandoned, which is a division of Ser. No. 91,961, Nov. 7, 1979, abandoned. This application Sep. 25, 1986, Ser. No. 912,212
Claims priority, application United Kingdom, Nov. 13, 1978, 44226; Apr. 3, 1979, 7911536; Jul. 3, 1979, 7923193
Int. Cl.[4] C07D *501/36*; A61K *31/545*
U.S. Cl. 514—206 **12 Claims**

1. A compound of the formula:



wherein
R^1 is amino or protected amino,
R^2 is lower alkyl substituted with 1 to 3 halogen atoms,
R^3 is thiadiazolylthiomethyl which may be substituted with lower alkyl, or tetrazolylthiomethyl which may be substituted with lower alkyl or lower alkenyl, and
R^4 is carboxy or protected carboxy,
and a pharmaceutically acceptable salt thereof.

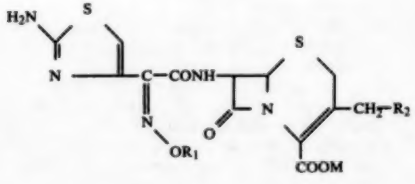
4,698,338

7[2-(2-AMINOTHIAZOL-4-YL)-2-BENZYLOXIMINO]ACETAMIDO-3[4-ALKYL-5-OXO-6-HYDROXY-3,4-DIHYDRO-1,2,4-TRIAZIN-3-YL]THIOMETHYL CEPHALOSPORINS

Allen S. Katner, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

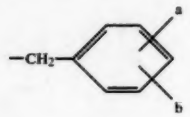
Filed Feb. 19, 1986, Ser. No. 831,033
Int. Cl.[4] A61K *31/545*; C07D *501/36*
U.S. Cl. 514—206 **13 Claims**

1. The compound of the formula



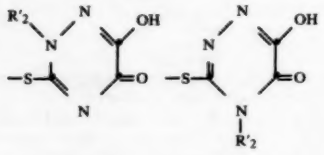
wherein

R^1 is a group of the formula



wherein a and b independently are hydrogen, hydroxy or halo provided that one of a or b is other than hydrogen,

R^2 is a triazine thio group of the formulae



wherein R'_2 is C_1–C_4 alkyl; and

M is hydrogen, a salt-forming cation or the residue of a biologically labile ester group.

11. The method for preventing or treating bacterial infections in man and animals which comprises administering to said man or animal an antibiotically effective amount of a compound of claim **1**.

4,698,339

CARBAPENEMS, THEIR PRODUCTION AND USE

Koichi Yoshioka, Kyoto; Norikazu Tamura, Suita, and Hideaki Natsugari, Ashiya, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 28, 1984, Ser. No. 655,454

Claims priority, application PCT Int'l Appl., Sep. 28, 1983, PCT/JP83/00319; Japan, Sep. 21, 1984, 59-199316

Int. Cl.[4] C07D *487/04;* A61K *31/40*

U.S. Cl. 514—210 **8 Claims**

1. The compounds:

(a) 5,6-cis-3-(2-pyrimidinylthio)-6-(1-hydroxy-3-thiacyclopentyl-3,3dioxido)-7-oxo-1-(azabicyclo-[3.2.0]-hept-2-ene-2-carboxylic acid,

(b) 5,6-cis-3-(2-aminoethylthio)-6-(1-hydroxy-3-thiacyclopentyl-3,3-dioxido)-7-oxo-1-azabicyclo-[3.2.0]-hept-2-ene-2-carboxylic acid,

(c) 5,6-cis-3-(2-piperazinoethylthio)-6-(1-hydroxy-3-thiacyclopentyl-3,3-dioxido)-7-oxo-1-azabicyclo-[3.2.0]hept-2-ene-2-carboxylic acid,

(d) 5,6-cis-3-[(E)-2-acetamidovinylthio]-6-(1-hydroxy-3-thiacyclopentyl-3,3-dioxido)-7-oxo-1-azabicyclo-[3.2.0]hept-2-ene-2-carboxylic acid,

(e) 5,6-cis-3-[(Z)-2-acetamidovinylthio]-6-(1-hydroxy-3-thiacyclopentyl-3,3-dioxido)-7-oxo-1-azabicyclo[3.2.0-]hept-2-ene-2-carboxylic acid,

(f) 5,6-cis-3-(3-pyrrolidinylthio)-6-(1-hydroxy-3-thiacyclopentyl-3,3-dioxido)-7-oxo-1-azabicyclo-[3.2.0]hept-2-ene-2-carboxylic acid, and

pharmaceutically acceptable salts thereof.

4,698,340

PYRIMIDINE DERIVATIVES, PROCESSES FOR PREPARATION THEREOF AND COMPOSITION CONTAINING THE SAME

Takao Takaya, Kawanishi; Hisashi Takasugi, Osaka; Atsushi Kuno, Mino, and Yoshie Sugiyama, Takarazuka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

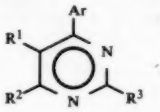
Filed Jul. 11, 1985, Ser. No. 753,912

Claims priority, application United Kingdom, Jul. 19, 1984, 8418380; Oct. 1, 1984, 8424711; Apr. 15, 1985, 8509623

Int. Cl.[4] A61K *31/505;* C07D *239/26*

U.S. Cl. 514—222 **15 Claims**

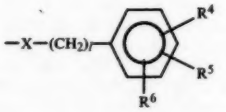
1. Pyrimidine derivatives of the formula:



(I)

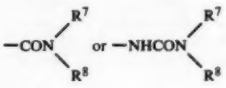
wherein

Ar is aryl substituted with 1 to 3 substituent(s) selected from the group consisting of nitro, amino, cyano, carbamoyl, halo(lower)alkyl, lower alkoxy, halo(lower)alkoxy, lower alkanoyloxy, lower alkylthio, lower alkanesulfinyl, lower alkanesulfonyl, esterified carboxy, N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower-)alkyl and lower alkoxy, and a group of the formula:

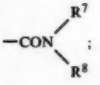


(in which X, l, R^4, R^5 and R^6 are each as defined in the below) or heterocyclic group containing one nitrogen and/or sulfur atom(s) and optionally substituted with nitro or halogen substituent(s);

R^1 is carboxy, esterified carboxy, lower alkanoyl, cyano, amino, carboxyamino, esterified carboxyamino, a group of the formula:



(in which R^7 and R^8 are each as defined in the below) or lower alkyl optionally substituted with 1 to 3 substituent(s) selected from the group consisting of hydroxy, halogen, cyano, carboxy, esterified carboxy and a group of the formula:



(in which R^7 and R^8 are each as defined in the below)

R^2 is hydrogen, aryl or lower alkyl optionally substituted with halogen, lower alkanoyloxy or lower alkoxy substituent(s); or

R^1 and R^2 are taken together to form a lactone ring with the adjacent carbon atoms;

R^3 is lower alkyl, aryl optionally substituted with halogen or N-containing heterocyclic group which may have 1 to 3

substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy;

X is O or S;

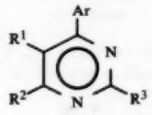
l is an integer of 0, 1 to 6;

R^4, R^5 and R^6 are each hydrogen, nitro, lower alkyl, halogen or lower alkoxy;

R^7 and R^8 are each hydrogen, N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy or lower alkyl optionally substituted with 1 to 3 substituent(s) selected from the group consisting of hydroxy, halogen, amino, lower alkanoylamino, mono- or di-(lower)alkylamino, tri(lower)alkylammonio and N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy; or

R^7 and R^8 are taken together to form N-containing heterocyclic group with the adjacent nitrogen atom, which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, lower alkoxy, ar(lower)alkyl and lower alkoxy substituted ar(lower)alkyl; provided that the substituent(s) on the aryl group for Ar is not halogen when R^2 is hydrogen, and its pharmaceutically acceptable salts.

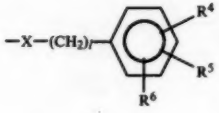
15. A method for treating cerebrovascular disease which comprises administering to a subject in need of treatment an effective amount of a pyrimidine derivative of the formula:



(I)

wherein

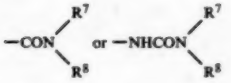
Ar is aryl substituted with 1 to 3 substituent(s) selected from the group consisting of nitro, amino, halogen, cyano, hydroxy, carbamoyl, halo(lower)alkyl, lower alkoxy, halo(lower)alkoxy, lower alkanoyloxy, lower alkylthio, lower alkanesulfinyl, lower alkanesulfonyl, esterified carboxy, N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy, and a group of the formula:



in which

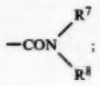
X, l, R^4, R^5 and R^6 are each as defined in the below, or heterocyclic group containing one nitrogen and/or sulfur atom(s) and optionally substituted with nitro or halogen substituent(s);

R^1 is carboxy, esterified carboxy, lower alkanoyl, cyano, amino, carboxyamino, esterified carboxyamino, a group of the formula:



in which

R^7 and R^8 are each as defined in the below, or lower alkyl optionally substituted with 1 to 3 substituent(s) selected from the group consisting of hydroxy, halogen, cyano, carboxy, esterified carboxy and a group of the formula:



in which

R^7 and R^8 are each as defined in the below,

R^2 is hydrogen, aryl or lower alkyl optionally substituted with halogen, lower alkanoyloxy or lower alkoxy substituent(s); or

R^1 and R^2 are taken together to form a lactone ring with the adjacent carbon atoms;

R^3 is lower alkyl, aryl optionally substituted with halogen or N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy;

X is O or S;

l is an integer of 0, 1 to 6;

R^4, R^5 and R^6 are each hydrogen, nitro, lower alkyl, halogen or lower alkoxy;

R^7 and R^8 are each hydrogen, N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy or lower alkyl optionally substituted with 1 to 3 substituent(s) selected from the group consisting of hydroxy, halogen, amino, lower alkanoylamino, mono- or di-(lower)alkylamino, tri(lower)alkylammonio and N-containing heterocyclic group which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, hydroxy(lower)alkyl and lower alkoxy; or

R^7 and R^8 are taken together to form N-containing heterocyclic group with the adjacent nitrogen atom, which may have 1 to 3 substituent(s) selected from the group consisting of lower alkyl, lower alkoxy, ar(lower)alkyl and lower alkoxy substituted ar(lower)alkyl; provided that the substituent(s) on the aryl group for Ar is not halogen when R^2 is hydrogen, and its pharmaceutically acceptable salts.

4,698,341

USE OF 1,6-NAPHTHYRIDINONE DERIVATIVES IN TREATING PULMONARY THROMBOSIS

Gerhard Satzinger, Denzlingen; Johannes Hartenstein, Stegen-Wittental; Karl Mannhardt, Elzach-Oberprechtal; Jürgen Kleinschroth, Denzlingen; Manfred Herrmann; Edgar Fritschi, both of St. Peter; Horst-Dietmar Tauschel, Ettenheim; Bernd Wagner, Denzlingen, and Günter Wolf, Freiburg, all of Fed. Rep. of Germany, assignors to Gödecke Aktiengesellschaft, Berlin, Fed. Rep. of Germany

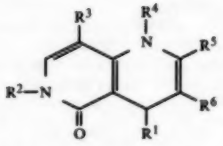
Continuation-in-part of Ser. No. 635,315, Jul. 27, 1984. This application Jul. 11, 1985, Ser. No. 753,758

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1983, 3327650; Jan. 29, 1985, 3502831

Int. Cl.[4] **A61K** *31/455, 31/535;* **C07D** *471/04*

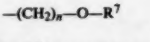
U.S. Cl. 514—230 **2 Claims**

1. A method of inhibiting thrombocyte aggregation comprising administering to a host in need thereof an effective amount of a compound of the formula



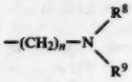
wherein R^1 represents phenyl or phenyl substituted in the 2- or 3-position by halogen, nitrogen, methyl, methoxy, difluoromethoxy, trifluoromethoxy, cyano, amino, mono-or dialkylamino having one to six carbon atoms, methylthio or trifluoromethyl,

or disubstituted in the 2,3 positions by methoxy or methylenedioxy or in the 2,3 or 2,6 positions by halogen atoms which may be the same or different; unsubstituted pyridyl, thienyl, or 2,1,3-benzoxadiazolyl; R^2 is hydrogen, a straight-chained or branched alkyl with up to ten carbon atoms, a group of the formula



$$-(CH_2)_n-O-R^7$$

wherein R^7 is a straight or branched alkyl group of one to six carbon atoms and n is two or three, or a group of the formula



wherein R^8 and R^9 are each independently a straight or branched alkyl group of one to six carbon atoms or taken together form an alkylene group of four to six carbon atoms, and n is two or three; R^3 is hydrogen, a straight-chained or branched alkyl group, or an alkoxycarbonyl radical with up to four carbon atoms; R^4 is hydrogen, or a morpholinoethyl group; R_5 is a straight-chained or branched alkyl group with up to four carbon atoms, or an amino group; and R^6 is a carboxyl group, or an alkyl- or alkyloxyalkyl carbonyl radical, containing up to 12 carbon atoms and optionally interrupted by an oxygen, sulphur, or nitrogen atom; or a pharmacologically acceptable acid addition or base salt thereof together with a pharmaceutically acceptable carrier or diluent.

4,698,342

METHOD AND COMPOSITIONS FOR CONTROLLING PAIN, DEPRESSION AND SEDATION

Martin G. Crosby, Mt. Pleasant, S.C., assignor to Serotonin Industries of Charleston, Charleston, S.C.

Division of Ser. No. 755,367, Jul. 16, 1985, Pat. No. 4,596,807, which is a continuation-in-part of Ser. No. 716,100, Mar. 26, 1985, abandoned. This application May 20, 1986, Ser. No. 830,717

Int. Cl.[4] A61K *31/34, 31/40, 31/435, 31/495*

U.S. Cl. 514—253 **9 Claims**

1. A method for controlling pain, depression, or sedation in an animal comprising co-administering to said animal (1) a composition comprising a serotonin precursor selected from the group consisting of L-tryptophan, L-5-hydroxy tryptophan, and pharmaceutically acceptable salts of L-tryptophan and L-5-hydroxy tryptophan in an amount effective to increase the brain serotonin to a supra normal level, in combination with a serotonin-specific reuptake inhibitor in an amount sufficient to inhibit the reuptake of serotonin, and (2) a narcotic selected from those compounds which achieve analgesia through the mode of enhancement of brain serotonin levels, said narcotic administered in an amount effective to produce analgesia in said animal.

4,698,343

(ALKOXY-2)PHENYLPIPERAZINES HAVING ALPHA-1 AND BETA BLOCKING PROPERTIES

Marie-Helene Creuzet, Bordeaux; Claude Feniou, Pessac; Francoise Guichard, Rue St Elisabeth; Henri Pontagnier, Pessac, and Gisele Prat, Talence, all of France, assignors to Societe Cortial, S.A., Paris, France

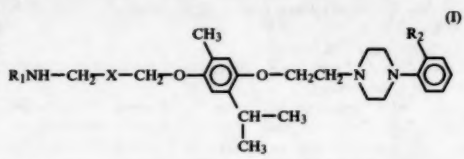
Filed Sep. 19, 1985, Ser. No. 777,530

Claims priority, application France, Sep. 19, 1984, 84 14579; Jul. 26, 1985, 85 11574

Int. Cl.[4] A61K *31/495;* **C07D** *241/04*

U.S. Cl. 514—255 **14 Claims**

1. A product of the formula



(I)

wherein:

R_1 is C_3–C_6 branched alkyl group;

R_2 is a C_1–C_6 alkoxy group; and

X is a CHOH group or a $(CH_2)_n$ group, where n =0, 1 or 2, the said product being in pharmaceutically acceptable free base form or acid salt form.

12. A method for treating arterial hypertension, cardiac arrhythmia or glaucoma comprising administering to a patient suffering therefrom an effective amount of the compound of claim 1.

4,698,344

1-HETEROARYL-4-ARYL-PYRAZOLIN-5-ONES FOR USE AS MEDICAMENTS

Klaus Sasse, Bergisch Gladbach, Fed. Rep. of Germany; Michael Hammond, Postcombe, United Kingdom; Friedel Seuter, Wuppertal, Fed. Rep. of Germany; Elisabeth Perzborn, Wuppertal, Fed. Rep. of Germany; Bernhard Pelster, Augustin, Fed. Rep. of Germany; Graham Sturton, Slough, and Trevor Abram, Marlow, both of United Kingdom, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

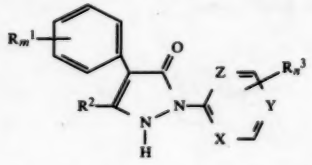
Filed Nov. 21, 1985, Ser. No. 800,485

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443308

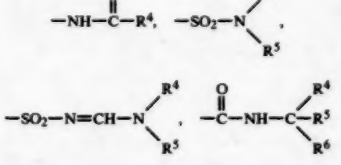
Int. Cl.[4] A61K *31/505, 31/44*

U.S. Cl. 514—275 **4 Claims**

1. A method of inhibiting lipoxygenase in a patient in need thereof which comprises administering to such patient a lipoxygenase-inhibiting effective amount of a 1-heteroaryl-4-aryl-pyrazolin-5-one of the formula



in which R^1 is hydrogen, halogen, hydroxyl, optionally substituted lower alkoxy, optionally substituted phenoxy, optionally substituted lower alkylmercapto, optionally substituted lower alkylsulphonyl, optionally fluorine-substituted lower alkyl, a fused-on carbocyclic or heterocyclic radical, carboxyl, lower alkoxycarbonyl or one of the groups



or

-continued

wherein R^4, R^5 and R^6 are identical or different and denote hydrogen, lower alkyl or phenyl, m denotes an integer from 1 to 5, R^2 denotes hydrogen or lower alkyl X, Y, Z denotes an N atom or a ring member

at least one of the radicals X, Y or Z denoting an N atom, R^3 denotes hydrogen, halogen, lower alkoxy, lower alkylmercapto, lower alkyl, lower halogenoalkyl, nitro, cyano, carboxylic acid amide or a fused-on phenylene radical and n denotes an integer from 1 to 4.

4,698,345

QUINOLINE DERIVATIVES AND THEIR USE AS ANTI-ASTHMATIC AGENTS

Ian D. Dicker, and John L. Suschitzky, both of Loughborough, England, assignors to Fisons plc, Ipswich, England

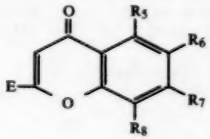
Filed Jan. 28, 1985, Ser. No. 695,460

Claims priority, application United Kingdom, Jan. 26, 1984, 8402047

Int. Cl.[4] A61K *31/395;* **C07D** *491/052*

U.S. Cl. 514—291 **8 Claims**

1. A benzopyran of formula I,



I

wherein R_6 and R_7 represent the chain —X—$CR_{12}R_{13}$—$CR_{14}R_{15}$—NR_{20}— in which the chain is substituted by E_1,

X represents $CR_{10}R_{11}$ or a single bond, and either (a) R_{14} and R_{20} together form a single bond and R_{10} and R_{12} together form a single bond, or (b) R_{12} and R_{14} together form a single bond,

the remainder of R_{10}, R_{11}, R_{12}, R_{13}, R_{14} and R_{15}, which may be the same or different, independently represent hydrogen, alkyl C_1 to C_6, $NR_{21}COR_{22}$, CN or $C_nH_xF_{(2n+1-x)}$; in addition R_{10} and R_{11}, together with the carbon atom to which they are attached, may represent C=O or C=N-OR_{23};

n represents an integer from 1 to 10 inclusive,

x represents 0 or an integer from 1 to 2n inclusive,

when R_{20} does not form a single bond with R_{14}, R_{20} may represent hydrogen, alkyl C_1 to C_6, phenyl or alkyl C_1 to C_6 substituted by phenyl,

R_{21}, R_{22} and R_{23}, which may be the same or different, independently represent hydrogen, alkyl C_1 to C_6 or phenyl;

R_5 and R_8, which may be the same or different, each independently represent hydrogen, hydroxy, alkoxy C_1 to C_6, alkyl C_1 to C_6, phenyl, or alkyl C_1 to C_6 substituted by phenyl,

E and E_1 represent —COOH,

provided that when the chain —X—$CR_{12}R_{13}$—$CR_{14}R_{15}$—NR_{20}—

(i) represents a chain —CO—CR_{13}=CR_{15}—NR_{20}—, in which one of R_{13} and R_{15} represents E_1, then E_1 represents hydrogen, and

(ii) represents a chain —CR_{11}=CR_{13}—CR_{14}=N—, then at least one of R_{11}, R_{13} or R_{15}, which may be the same or different, represents $NR_{21}COR_{22}$, CN or $C_nH_xF_{(2n+1-x)}$,

and pharmaceutically acceptable derivatives thereof.

7. An anti-asthmatic pharmaceutical composition which comprises an anti-asthmatic effective amount of at least one compound according to claim 1 in association with a pharmaceutically acceptable adjuvant, diluent, or carrier.

4,698,346

THIAZOLO[5,4-H]QUINOLINE COMPOUNDS USEFUL AS ANTI-ALLERGY AGENTS

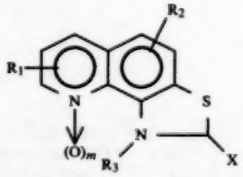
John H. Musser, Malvern, Pa., and Richard E. Brown, East Hanover, N.J., assignors to USV Pharmaceutical Corporation, Fort Washington, Pa.

Division of Ser. No. 731,689, May 8, 1985, Pat. No. 4,656,281, which is a division of Ser. No. 476,673, Mar. 18, 1983, Pat. No. 4,522,947, which is a continuation-in-part of Ser. No. 362,712, Mar. 29, 1982, abandoned. This application Jul. 24, 1986, Ser. No. 889,021

Int. Cl.[4] A61K *31/425;* **C07D** *513/04*

U.S. Cl. 514—293 **7 Claims**

1. A compound of formula



and salts thereof, wherein

R_1 and R_2 are independently hydrogen, C_1–C_5 alkyl, halo, trifluoromethyl, amino, C_1–C_5 alkyl amino, cyano, C_1–C_5 alkynyl, phenyl, phenyl-C_1–C_5 alkyl, C_1–C_5 alkenyl, nitro, C_1–C_5 alkyl sulfinyl, C_1–C_5 alkyl sulfonyl, C_1–C_5 alkoxycarbonyl, carboxyl, C_1–C_5 alkoxy, C_1–C_5 alkanoyl, or C_1–C_5 alkenoyl;

m is 0 or 1;

R_3 is hydrogen, C_1–C_5 alkyl, C_1–C_5 alkenyl, C_1–C_5 alkynyl, phenyl, phenyl-C_1–C_5 alkyl, C_1–C_5 alkylaminoalkyl, amino C_1–C_5 alkyl, or carboxy C_1–C_5 alkyl; and

X is cyano, formyloximino, tetrazolyl, carbalkoxy C_1–C_5 alkyl, carboxy C_1–C_5 alkyl, or $COOR_4$ in which the R_4 group is hydrogen, C_1–C_5 alkyl or a C_1–C_5 alkyl substituted by a C_1–C_5 alkoxy or amino group.

7. A method of treating asthma in a mammal suffering from asthma which comprises administering to said mammal an anti-asthma effective amount of a compound according to claim 1.

4,698,347

OCTAHYDRO-OXAZOLO[4,5-G]QUINOLINES DERIVATIVES AND DECAHYDRO QUINOLINE INTERMEDIATES AND THEIR USE AS DOPAMINE D-2 AGONISTS

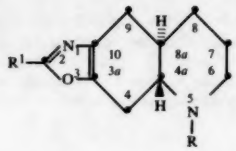
John M. Schaus, and Robert D. Titus, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 743,198, Jun. 10, 1985, Pat. No. 4,659,832, which is a continuation-in-part of Ser. No. 637,232, Aug. 2, 1984, abandoned. This application Dec. 11, 1986, Ser. No. 939,932

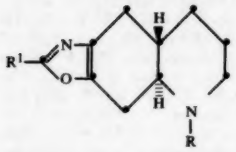
Int. Cl.[4] A61K *31/41;* **C07D** *498/04, 215/20*

U.S. Cl. 514—293 **37 Claims**

1. A trans-(±)-racemate containing trans-(−) and trans-(+) enantiomers of the formulas



and



wherein R is C_{1-3} straight-chain alkyl or allyl and R^1 is H, C_{1-3} alkyl, O—C_{1-3} alkyl, NH_2, NHC_{1-3} alkyl, $N(C_{1-3}$ alkyl$)_2$, 1-pyrrolidinyl, 1-piperidinyl or $NHCOC_{1-3}$ alkyl; and pharmaceutically-acceptable acid addition salts thereof.

4,698,348

1-H-IMIDAZO[4,5-c]QUINOLINES AND THEIR USE AS BRONCHODILATING AGENTS

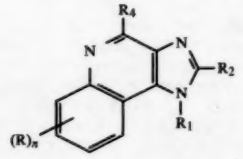
John F. Gerster, Woodbury, Minn., assignor to Riker Laboratories, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 785,773, Oct. 9, 1985, which is a continuation of Ser. No. 553,157, Nov. 18, 1983, abandoned. This application Nov. 15, 1985, Ser. No. 798,386

Int. Cl.[4] **A61K** *31/415;* **C07D** *471/04, 215/38*

U.S. Cl. 514—293 **10 Claims**

1. A compound of the formula



wherein R_1 is selected from the group consisting of hydrogen, alkyl of one to about ten carbon atoms, hydroxyalkyl of one to about six carbon atoms, benzyl, (phenyl)ethyl and phenyl, said benzyl, (phenyl)ethyl or phenyl substituent being optionally substituted on the benzene ring by one or two moieties independently selected from the group consisting of alkyl of one to about four carbon atoms, alkyl alkanoate wherein the alkyl moiety contains one to about four carbon atoms and the alkanoate moiety contains two to about four carbon atoms, alkoxy of one to about four carbon atoms and halogen, with the proviso that if said benzene ring is substituted by two of said moieties, then said moieties together contain no more than 6 carbon atoms; R_2 is selected from the group consisting of hydrogen, trifluoromethyl, hydroxyalkyl of one to about six carbon atoms, aminoalkyl of one to about four carbon atoms, alkanamidoalkyl wherein each alkyl radical is one to about four carbon atoms, benzylthio, mercapto, alkylthio of one to about four carbon atoms, and alkyl of one to about eight carbon atoms, with the proviso that when R_2 is mercapto and R_1 is alkyl, R_1 is alkyl of one to four carbon atoms; R_4 is selected from the group consisting of hydrogen, chloro, alkoxy of one to about four carbon atoms, hydroxy, alkylamino of one to about four carbon atoms, dialkylamino wherein each alkyl radical contains one to about four carbon atoms, alkyl of one to about four carbon atoms, phenylthio, alkylthio of one to about four carbon atoms, and morpholino, with the proviso that when R_2 is mercapto, alkylthio or benzylthio, R_4 is hydrogen or alkyl; and each R is independently selected from the group consisting of alkoxy of one to four carbon atoms, alkyl of one to four carbon atoms, and halogen, and n is an integer from 0 to 2, with the proviso that if n is 2, then said R substituents together contain no more than 6 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

9. A bronchodilator pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable vehicle, said compound being present in an amount effective to cause bronchodilation.

4,698,349

QUINOLIZINONE COMPOUNDS, AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME, USEFUL AS ANTI-ULCERATIVE AND ANTI-ALLERGIC AGENTS

Yoshihiko Kitaura, Nagoya; Teruo Oku, Osaka; Hideo Hirai, Nishinomiya; Tosiyuki Yamamoto, Ikeda, and Masashi Hashimoto, Nakayama, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

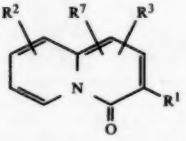
Continuation-in-part of Ser. No. 712,435, Mar. 18, 1985, Pat. No. 4,650,804. This application Aug. 30, 1985, Ser. No. 770,953

Claims priority, application United Kingdom, Mar. 30, 1984, 8408292; Nov. 23, 1984, 8429710

Int. Cl.[4] **A61K** *31/345;* **C07D** *455/02*

U.S. Cl. 514—306 **13 Claims**

1. A compound of the formula:



wherein

R^1 is carboxy, carbamoyl, phenylcarbamoyl which may have hydroxy, cyano or thiocarbamoyl,

R^7 is hydrogen or aryl selected from phenyl, tolyl, xylyl, cumenyl, naphthyl and biphenylyl;

R^2 is hydrogen, hydroxy, lower alkyl or lower alkoxy; and

R^3 is hydrogen, hydroxy, lower alkyl, lower alkoxy, lower alkenyloxy, phenyl, naphthyl, biphenylyl, phenyl having one or more substituent(s) selected from halogen, lower alkyl and lower alkoxy, arylthio selected from phenylthio, tolylthio, xylylthio, cumenylthio, naphthylthio and biphenylthio, aroyl selected from benzoyl, toluoyl and naphthoyl, ar(lower)alkyl selected from phenyl(lower alkyl, tolyl(lower)alkyl, xylyl(lower)alkyl, cumenyl(lower)alkyl, naphthyl(lower)alkyl and biphenylyl(lower)alkyl, arenesulfonyl selected from benzenesulfonyl and P-toluenesulfonyl, arylamino selected from phenylamino, naphthylamino, biphenylylamino, phenylamino having lower alkyl on the nitrogen atom or aryloxy selected from phenoxy and tolyloxy;

or pharmaceutically acceptable salts thereof.

10. A method for treating ulcer disease in human beings or animals which comrpises administering an antiulceratively effective amount of a compound of claim 1 or pharmaceutically acceptable salt thereof to said human beings or animals.

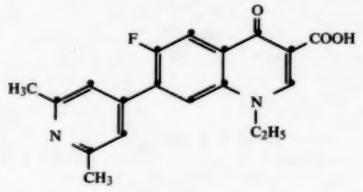
4,698,350

1-ETHYL-6-FLUORO-1,4-DIHYDRO-7-(2,6-DIMETHYL-4-PYRIDINYL)-4-OXO-3-QUINOLINECARBOXYLIC ACID AND ANTIBACTERIAL USE THEREOF

Sol J. Daum, Albany, and George Y. Lesher, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Sep. 17, 1984, Ser. No. 651,121
Int. Cl.[4] A61K *31/47*; C07D *215/18*
U.S. Cl. 514—312 5 Claims

1. 1-Ethyl-6-fluoro-1,4-dihydro-7-(2,6-dimethyl-4-pyridinyl)-4-oxo-3-quinolinecarboxylic acid of the formula



and pharmaceutically acceptable non-toxic acid-addition or cationic salts thereof.

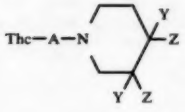
4,698,351

TETRAHYDROCARBAZOLE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS

Hans-Heinrich Hausberg, Ober-Ramstadt; Henning Böttch, Darmstadt; Rudolf Gottschlich, Reinheim; Christoph Seyfried, Seeheim-Jugenheim, and Klaus-Otto Minck, Ober-Ramstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany

Division of Ser. No. 818,859, Jan. 15, 1986, Pat. No. 4,618,614, which is a division of Ser. No. 747,594, Jul. 24, 1985, abandoned, which is a division of Ser. No. 568,310, Jan. 4, 1984, Pat. No. 4,547,756. This application Aug. 22, 1986, Ser. No. 899,453
Claims priority, application Fed. Rep. of Germany, Jan. 4, 1983, 3300094; Oct. 8, 1983, 3336643
Int. Cl.[4] A61K *31/44*; C07D *401/06, 491/056*
U.S. Cl. 514—338 15 Claims

1. A tetrahydrocarbazole derivative of the formula



wherein,

Thc is 1,2,3,4-tetrahydro-3-carbazolyl, 1,2,3,4-tetrahydro-3-carbazolyl substituted once or twice by alkyl, O-alkyl, S-alkyl, SO-alkyl, SO_2-alkyl, OH, F, Cl, Br, CF_3 or CN or by a methylenedioxy group;

the two radicals Y together form a C-C bond;

one radical Z is Ar and the other radical Z is H;

A is $—CH_2—$ or $—CH_2CH_2—$; and

Ar is phenyl, phenyl substituted once or twice by alkyl, O-alkyl, S-alkyl, SO-alkyl, SO_2-alkyl, OH, F, Cl, Br, CF_3 or CN or by a methylenedioxy group, or is 2- or 3-thienyl;

all alkyl groups each have 1-4 C atoms;

or a physiologically acceptable acid addition salt thereof.

14. A composition comprising a compound of claim 1, and a pharmacologically acceptable carrier.

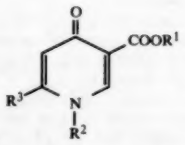
4,698,352

4-OXO-1,4-DIHYDRONICOTINIC ACID DERIVATIVES, SALTS THEREOF, AND ANTIBACTERIAL AGENTS CONTAINING THE SAME

Hirokazu Narita, Toyama; Yoshinori Konishi, Takaoka; Jun Nitta, Namekawa; Shunjiro Misumi, Chofu; Hideyoshi Nagaki, Toyama; Isao Kitayama, Toyama; Yoriko Nagai, Toyama; Yasuo Watanabe, Toyama; Nobuyuki Matsubara, Toyama; Shinzaburo Minami, Toyama, and Isamu Saikawa, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1983, Ser. No. 546,165
Claims priority, application Japan, Oct. 29, 1982, 57-188930; Oct. 24, 1983, 58-197624
Int. Cl.[4] A61K *31/455*; C07D *213/80, 401/02, 405/02*
U.S. Cl. 514—339 13 Claims

1. A 4-oxo-1,4-dihydronicotinic acid derivative of the formula:



or a salt thereof, wherein

R^1 is hydrogen or a carboxyl-protecting group;

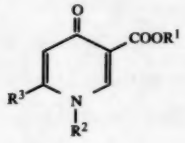
R^2 is a group selected from the group consisting of substituted phenyl and naphthyl, and a substituted and unsubstituted heterocyclic group; and

R^3 is a haloalkyl, aminoalkyl, or a group selected from the group consisting of substituted or unsubstituted alkenyl, phenylalkenyl, naphthylalkenyl, phenylalkyl, naphthylalkyl, phenylalkadienyl, naphthylalkadienyl, phenylalkynyl, naphthylalkynyl, heterocyclic alkyl, heterocyclic alkenyl, phenyl, naphthyl, cycloalkyl, cycloalkenyl, carboxylic acyl, iminoalkyl, heterocyclic and bridged hydrocarbon; wherein the substituents of said substituted R^2 and R^3 groups are selected from the group consisting of halogen, alkyl, phenylalkyl, naphthylalkyl, hydroxyl, alkoxy, alkylthio, nitro, cyano, amino, alkylamino, dialkylamino, alkenylamino, carboxyl, carbamoyl, carboxylic acyl, carboxylic acyloxy, carboxylic acylalkyl, carboxylic acylamino, alkoxycarbonyl, aminoalkyl, alkylaminoalkyl, dialkylaminoalkyl, hydroxyalkyl, hydroxyiminoalkyl, alkoxyalkyl, carboxyalkyl, alkoxycarbonylalkyl, sulfoalkyl, sulfo, sulfoxy, sulfamoyl, sulfamoylalkyl, carbamoylalkyl, phenyl, naphthyl, phenylthio, naphthylthio, phenoxy, naphthoxy, oxo, thioxo, mercapto, ureido, hydroxyamino, hydroxyalkylamino, haloalkyl, alkenyl, alkynyl, cycloalkyl, cycloalkadienyl, alkylenedioxy, epoxy, and a heterocyclic group; and wherein said substituents of R^2 and R^3 may be substituted with at least one substituent selected from the group consisting of halogen, hydroxyl, carboxyl, nitro, alkyl, alkoxy, amino, alkylamino, dialkylamino, phenyl, naphthyl, and carboxylic acyl; and the term heterocyclic of R^2 and R^3 is thienyl, furyl, pyrrolyl, imidazolyl, pyrazoyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, furazanyl, pyrrolidinyl, pyrrolinyl, imidazolidinyl, imidazolinyl, pyrazolidinyl, pyrazolinyl, oxadiazolyl, thiadiazolyl, triazolyl, tetrazolyl, thiatriazolyl, pyridyl, pyrazinyl, primidinyl, pyridazinyl, piperidinyl, piperazinyl, pyranyl, morpholinyl, pyridin-1-oxide-2-yl, pyridazin-1-oxide-6-yl, quinolin-1-oxide-6-yl, triazinyl, benzothienyl, naphthothienyl, benzofuryl, 2,3-dihydrobenzofuryl, benzothiazolyl, isobenzofuryl, chromenyl, indolidinyl, isoindolyl, indolyl, indazolyl, purinyl, quinolyl, isoquinolyl, 1,2,3,4-tetrahydroquinolyl, 1,2-dihydroquinolyl, phthalazinyl, naphthylidinyl, quinoxalinyl, 1,2,3,4-tetrahydroquinoxalinyl, quinazolinyl, cinnolinyl, pteridinyl, isochromanyl, chromanyl, indolinyl, isoindolinyl, benzox-

azolyl, benzomorpholinyl, triazolopyridyl, tetrazolopyridazinyl, tetrazolopyrimidinyl, thiazolopyridazinyl, thiadiazolopyridazinyl, or triazolopyridazinyl; and the term "carboxylic acyl" of R^3 is formyl, alkanoyl, benzoyl, p-nitrobenzoyl or heterocyclic carbonyl group.

8. An antibacterial agent comprising:

(a) an antibacterially effective amount of a 4-oxo-1,4-dihydronicotinic acid derivative of the formula:



or a salt thereof, wherein

R^1 is hydrogen or a carboxyl-protecting group;

R^2 is a group selected from the group consisting of substituted phenyl or naphthyl, and a substituted or unsubstituted heterocyclic group; and

R^3 is haloalkyl, aminoalkyl, or a group selected from the group consisting of substituted or unsubstituted alkenyl, phenylalkenyl, naphthylalkenyl, phenylalkyl, naphthylalkyl, phenylalkadienyl, naphthylalkadienyl, phenylalkynyl, naphthylalkynyl, heterocyclic alkyl, heterocyclic alkenyl, phenyl, naphthyl, cycloalkyl, cycloalkenyl, carboxylic acyl, iminoalkyl, heterocyclic and bridged hydrocarbon; wherein the substituents of said substituted R^2 and R^3 groups are selected from the group consisting of halogen, alkyl, phenylalkyl, naphthylalkyl, hydroxyl, alkoxy, alkylthio, nitro, cyano, amino, alkylamino, dialkylamino, alkenylamino, carboxyl, carbamoyl, carboxylic acyl, carboxylic acyloxy, carboxylic acylalkyl, carboxylic acylamino, alkoxycarbonyl, aminoalkyl, alkylaminoalkyl, dialkylaminoalkyl, hydroxyalkyl, hydroxyiminoalkyl, alkoxyalkyl, carboxyalkyl alkoxycarbonylalkyl, sulfoalkyl, sulfo, sulfoxy, sulfamoyl, sulfamoylalkyl, carbamoylalkyl, phenyl, naphthyl, phenylthio, naphthylthio, phenoxy, naphthoxy, oxo, thioxo, mercapto, ureido, hydroxyamino, hydroxyalkylamino, haloalkyl, alkenyl, alkynyl, cycloalkyl, cycloalkadienyl, alkylenedioxy, epoxy, and a heterocyclic group; and wherein said substituents of R^2 and R^3 may be substituted with at least one substituent selected from the group consisting of halogen, hydroxyl, carboxyl, nitro, alkyl, alkoxy, amino, alkylamino, dialkylamino, phenyl, naphthyl, and carboxylic acyl; and the term heterocyclic of R^2 and R^3 is thienyl, furyl, pyrrolyl, imidazolyl, pyrazoyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, furazanyl, pyrrolidinyl, pyrrolinyl, imidazolidinyl, imidazolinyl, pyrazolidinyl, pyrazolinyl, oxadiazolyl, thiadiazolyl, triazolyl, tetrazolyl, thiatriazolyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, piperidinyl, piperazinyl, pyranyl, morpholinyl, pyridin-1-oxide-2-yl, pyridazin-1-oxide-6-yl, quinolin-1-oxide-6-yl, triazinyl, benzothienyl, naphthothienyl, benzofuryl, 2,3-dihydrobenzofuryl, benzothiazolyl, isobenzofuryl, chromenyl, indolidinyl, isoindolyl, indolyl, indazolyl, purinyl, quinolyl, isoquinolyl, 1,2,3,4-tetrahydroquinolyl, 1,2-dihydroquinolyl, phthalazinyl, naphthylidinyl, quinoxalinyl, 1,2,3,4-tetrahydroquinoxalinyl, quinazolinyl, cinnolinyl, pteridinyl, isochromanyl, chromanyl, indolinyl, isoindolinyl, benzoxazolyl, benzomorpholinyl, triazolopyridyl, tetrazolopyridazinyl, tetrazolopyrimidinyl, thiazolopyridazinyl, thiadiazolopyridazinyl, or triazolopyridazinyl; and the term "carboxylic acyl" in R^2 and R^3 is formyl, alkanoyl, benzoyl, p-nitrobenzoyl or heterocyclic carbonyl group; and

(b) a pharmaceutically acceptable carrier.

4,698,353

CARDIOTONIC HETEROCYCLIC OXAZOLONES

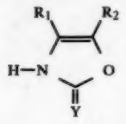
Richard A. Schnettler; Winton D. Jones, Jr., and George P. Claxton, all of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Nov. 13, 1985, Ser. No. 797,580

Int. Cl.[4] C07D *401/00, 419/00, 413/00, 263/04*

U.S. Cl. 514—340 **21 Claims**

1. A heterocyclic oxazolone of the formula



wherein

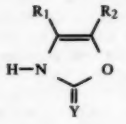
Y is an oxygen or sulfur group;

R_1 is a hydrogen or a (C_1–C_5) alkyl group when R_2 is R;

R_2 is a hydrogen or a (C_1–C_5) alkyl group when R_1 is R; and

R is a 2-, 3- or 4-pyridyl group optionally substituted with a hydroxy, halogen, (C_1–C_5) alkyl, (C_1–C_5) alkoxy, (C_1–C_5) alkylthio, (C_1–C_5)alkylsulfinyl, (C_1–C_5)alkylsulfonyl, cyano, carboxy, carb(C_1–C_5)alkoxy, carbamido, (C_1–C_5) alkanoylamino, or imidazolyl group, or R is a 2- or 3-furanyl, 2- or 3-thienyl or 2- or 3-pyranyl group with the proviso that when either of R_1 or R_2 is a hydrogen, R cannot be a 2- or 3-thienyl group.

8. A method of treating heart failure in a patient in need thereof which comprises administering to the patient a cardiotonically effective amount of a heterocyclic oxazolone of the formula



wherein

Y is an oxygen or sulfur group;

R_1 is a hydrogen or a (C_1–C_5) alkyl group when R_2 is R;

R_2 is a hydrogen or a (C_1–C_5) alkyl group when R_1 is R; and

R is a 2-, 3- or 4-pyridyl group optionally substituted with a hydroxy, halogen, (C_1–C_5) alkyl, (C_1–C_5) alkoxy, (C_1–C_5) alkylthio, (C_1–C_5)alkylsulfinyl, (C_1–C_5)alkylsulfonyl, cyano, carboxy, carb(C_1–C_5)alkoxy, carbamido, (C_1–C_5) alkanoylamino, or imidazolyl group, or R is a 2- or 3-furanyl, 2- or 3-thienyl or 2- or 3-pyranyl group.

4,698,354

4-METHOXY-ISOPHTHALIC ACID DERIVATIVE HAVING A PHARMACOLOGICAL ACTIVITY IN THROMBOEMBOLIC DISORDERS

Massimo De Regis, Sesto Fiorentino, and Emanuela Mannucci, Florence, both of Italy, assignors to Societa Italo-Brittanica L. Manetti-H. Roberts & Co., Florence, Italy

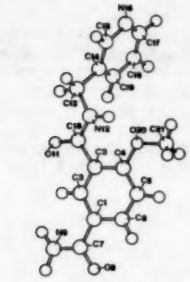
Filed Oct. 8, 1986, Ser. No. 917,072

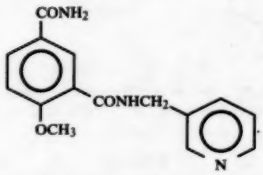
Claims priority, application Italy, Oct. 10, 1986, 9499 A/85

Int. Cl.[4] A61K *31/44;* **C07D** *211/04*

U.S. Cl. 514—357 **3 Claims**

1. 3-carbamoyl-(3'-picolyl)-4-methoxy-1-benzamide of formula:





2. A method for preventing and treating thromboembolic disorders due to blood platelet aggregation in mammals, comprising administering an amount of 3-carbamoyl-(3'-picolyl)-4-methoxy-1-benzamide therapeutically effective to prevent and treat said disorders.

4,698,355

ANTI-HYPERTENSIVE AGENTS

James W. Ryan, and Alfred Chung, both of Miami, Fla., assignors to University of Miami, Coral Gables, Fla.

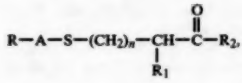
Filed Aug. 14, 1979, Ser. No. 64,903

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] **A61K** *31/40, 31/41;* **C07D** *207/00, 211/72*

U.S. Cl. 514—362 **18 Claims**

1. A new compound having the formula



wherein

R is L-arginyl, L-lysyl or L-pyroglutamyl;

A is L-phenylalanyl, glycyl, L-alanyl, L-tryptophyl, L-tyrosyl, L-isoleucyl, L-leucyl, L-histidyl, or L-valyl whose amino group is in amide linkage with R;

R_1 is hydrogen or methyl;

R_2 is a residue of L-proline, L-3,4-dehydroproline, D,L-3,4-dehydroproline, L-3-hydroxyproline, L-4-hydroxyproline or L-thiazolidine-4-carboxylic acid whose imino group is in imide linkage with the adjacent

and,

n is 0 or 1, such that when n=0, R_1 is methyl.

4,698,356

ANTI-HYPERTENSIVE AGENTS

James W. Ryan, and Alfred Chung, both of Miami, Fla., assignors to University of Miami, Coral Gables, Fla.

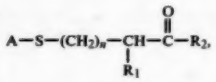
Filed Aug. 14, 1979, Ser. No. 64,899

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] **A61K** *31/40, 31/41;* **C07D** *207/00, 211/72*

U.S. Cl. 514—362 **18 Claims**

1. A new compound having the formula



wherein

A is L-phenylalanyl, glycyl, L-alanyl, L-tryptophyl, L-tyrosyl, L-isoleucyl, L-leucyl, L-histidyl, or L-valyl;

R_1 is hydrogen or methyl;

R_2 is a residue of L-proline, L-3,4-dehydroproline, D,L-3,4-dehydroproline L-3-hydroxyproline, L-4-hydroxyproline or L-thiazolidine-4-carboxylic acid whose imino group is in the imide linkage with the

and,

n is 0 or 1, such that when n=0, R_1 is methyl.

4,698,357

2,4-DICHLORO-5-NITRO-THIAZOLE

Gunther Beck; Paul Reinecke, both of Leverkusen; Wilfried Paulus, and Hans-Georg Schmitt, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

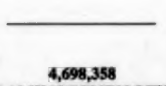
Filed May 15, 1986, Ser. No. 863,638

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518520

Int. Cl.[4] **C07D** *277/58;* **A01N** *43/78*

U.S. Cl. 514—370 **3 Claims**

1. 2,4-Dichloro-5-nitro-thiazole of the formula



4,698,358

USE OF 3-ACYLAMINOBENZISOTHIAZOLES FOR CONTROLLING PESTS

Jozef Drabek, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

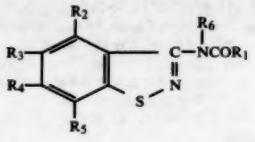
Continuation of Ser. No. 637,086, Aug. 2, 1984, abandoned. This application Aug. 13, 1986, Ser. No. 896,562

Claims priority, application Switzerland, Aug. 9, 1983, 4335/83

Int. Cl.[4] **A01N** *43/80;* **C07D** *275/04*

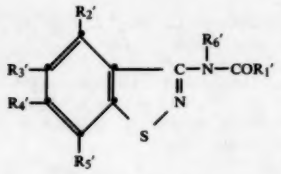
U.S. Cl. 514—373 **5 Claims**

1. A method of controlling insects, and members of the order Acarina on animals and plants and in the soil, which method comprises applying thereto or to the locus thereof an insecticidally effective amount of a compound of the formula I



wherein R_1 is C_1–C_3 -alkyl, unsubstituted or substituted by halogen or phenyl, R_2, R_3, R_4 and R_5 independently of one another are each hydrogen, halogen, C_1–C_5-alkyl, C_1–C_5-alkoxy, trifluoromethyl, amino or nitro, and R_6 is hydrogen or —COR_1.

2. A 3-acylaminobenzisothiazole of the formula



(Ia)

wherein

R_1' is C_1–C_3-perfluoroalkyl

R_2', R_3', R_4' and R_5' independently of one another are each hydrogen, chlorine, trifluoromethyl, amino or nitro, and R_6' is hydrogen or —COR_1'

4,698,359

MEDICATED SUPPOSITORY

Roland R. Niederer, Stetten, and Hans W. Zulliger, Andelfingen, both of Switzerland, assignors to Cilag, AG, Schaffhausen, Switzerland

Continuation-in-part of Ser. No. 411,123, Aug. 24, 1982, abandoned. This application May 31, 1985, Ser. No. 739,808

Int. Cl.[4] A61K *31/415*

U.S. Cl. 514—396 **9 Claims**

1. A medicated suppository comprising about 60–87% by weight of a mixture of triglycerides of the fatty acids $C_{10}H_{20}O_2$ to $C_{18}H_{36}O_2$; 5–25% by weight of a gel forming agent selected from the group consisting of polygum, guar gum, alkali metal and alkaline earth metal salts of alginic aid, polygel and xanthan gum; 4–5% by weight of a gel dispersing agent selected from the group consisting of stearyl heptanoate, purcelline oil, partial fatty acid glycerol esters and polyethylene sorbitan fatty acid esters and 4–15% by weight of a medicament.

4,698,360

PLANT EXTRACT WITH A PROANTHOCYANIDINS CONTENT AS THERAPEUTIC AGENT HAVING RADICAL SCAVENGER EFFECT AND USE THEREOF

Jack Masquelier, Parc des Tourelles, France, assignor to Societe Civile d'Investigations Pharmacologiques d'Aquitaine, Bordeaux, France and Horphag Overseas Ltd., St. Peter Port, Guernsey, Great Britain

Filed Apr. 9, 1985, Ser. No. 721,434

Int. Cl.[4] A61K *31/35*

U.S. Cl. 514—456 **7 Claims**

1. A method for preventing and fighting the harmful biological effect of free radicals in a warm blooded animals, including a human being, comprising administering the extracted proanthocyanidin content from a plant containing same, said extract having a bioavailable radical scavenger effect, to an animal exposed to said free radicals in an amount effective to reduce said harmful free radical effect, said extracted proanthocyanidin content being incorporated into a pharmaceutically acceptable medicament.

4,698,361

TRIS-CHYDROXYMETHYL) AMINOMETHANE SALT OF 4-CHLORO-N-FURFURYL-5-SULFAMOYL ANTHRANILIC ACID AND DIURETIC COMPOSITIONS CONTAINING THE SAME

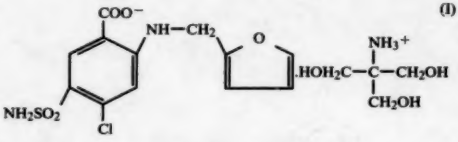
Michele G. Di Schiena, Via Carducci, 21, 20090 Trezzano Sul Naviglio, Italy

Filed May 28, 1986, Ser. No. 867,446

Int. Cl.[4] C07D *307/52;* **A61K** *31/34*

U.S. Cl. 514—471 **6 Claims**

1. A compound having the formula (I):



(I)

which is the tris(hydroxymethyl)aminomethane salt of 4-chloro-N-furfuryl-5-sulfamoylanthranilic acid.

4,698,362

LOW VISCOSITY OIL BASED PESTICIDE COMPOSITIONS

Jimmie G. Shafer, Gladstone, Mo., assignor to Mobay Corporation, Pittsburgh, Pa.

Filed Mar. 14, 1985, Ser. No. 711,702

Int. Cl.[4] A01N *47/10, 47/28, 57/26*

U.S. Cl. 514—490 **17 Claims**

1. A process for the production of pesticide concentrates which are storage stable, non-caking and of low viscosity which comprises milling an insecticidally effective amount of a solid insecticidally active compound selected from the group consisting of aminocarb and 2-chloro-N-[[[4-(trifluoromethoxyl)phenyl]amino]carbonyl]benzamide in a low viscosity aliphatic petroleum fraction in which it is slightly soluble until it has an average particle size of less than about 10 microns at a temperature in excess of about 40° C. in the presence of a high or ultra high surface area silica and lecithin without melting any significant portion of said compound.

4,698,363

PROSTACYCLIN ANALOGUES

Terance W. Hart, Essex, England, assignor to May & Baker Limited, Essex, England

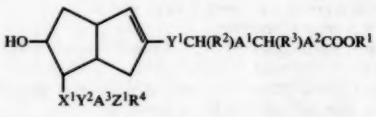
Filed Nov. 20, 1985, Ser. No. 799,796

Claims priority, application United Kingdom, Nov. 22, 1984, 8429545

Int. Cl.[4] C07C *177/00;* **A61K** *31/557*

U.S. Cl. 514—530 **23 Claims**

1. A prostaglandin analogue of the formula:



II

(wherein R^1 represents a hydrogen atom or a straight-or branched-chain akyl group containing from 1 to 12 carbon atoms, optionally substituted by a cycloalkyl group containing from 3 to 8 carbon atoms, or a mono-, bi- or tri-cycloalkyl or mono-, bi- or tri-cycloalkenyl group containing up to 10 carbon atoms and optionally substituted by one or two straight- or

branched-chain alkyl or alkenyl groups each containing up to 3 carbon atoms, Y^1 represents a carbonyl or hydroxymethylene group, A^1 represents an alkylene linkage containing 1, 2 or 3 carbon atoms and optionally bearing a methyl or ethyl substituent, R^2 represents a hydrogen atom or a methyl or ethyl group and R^3 represents a hydrogen atom or R^2 and R^3 form an alkylene linkage containing 2 or 3 carbon atoms, optionally bearing a methyl or ethyl substituent, such that the symbols A^1, R^2 and R^3, together with the carbon atoms through which they are connected, may form a cycloalkyl ring of 5, 6, 7 or 8 carbon atoms, optionally bearing one or two methyl or ethyl substituents, or A^1 and R^3, together with the carbon atom through which they are connected, may form a phenylene ring optionally substituted by a halogen atom or by a trifluormethyl group or by a straight- or branched-chain alkyl or alkoxy group containing from 1 to 6 carbon atoms, A^2 represents a direct bond or a methylene group optionally bearing one or two methyl or ethyl substituents, X^1 represents an ethylene, trans-vinylene or ethynylene group, Y^2 represents a carbonyl or hydroxymethylene group, and either (i) A^3 represents a straight- or branched-alkylene chain containing from 1 to 5 carbon atoms, Z^1 represents a direct bond or an oxygen or sulphur atom, and R^4 represents a group $R^{4'}$ which is a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms, optionally substituted by a cycloalkyl group containing from 3 to 8 carbon atoms, or a mono-, bi-or tri-cycloalkyl or mono, bi- or tri-cycloalkenyl group containing up to 10 carbon atoms and optionally substituted by one or two straight- or branched-chain alkyl or alkenyl groups each containg up to 3 carbon atoms, or R^4 represents a phenyl group optionally substituted by a halogen atom or by a trifluoromethyl group or by a straight- or branched- chain alkyl or alkoxy group containing from 1 to 6 carbon atoms, or (ii) A^3 and Z^1 both represent direct bonds and R^4 represents a group $R^{4'}$ as hereinbefore defined) or a cyclodextrin clathrate thereof or when R^1 represents a hydrogen atom a non-toxic salt thereof.

4,698,364

BENZOIC ACID DERIVATIVES

Mitsuru Tanemura; Isao Matsunaga, both of Tokyo, and Masami Saitou, Kanagawa, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

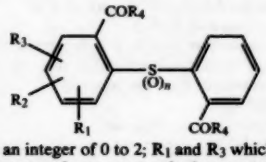
Filed Oct. 18, 1985, Ser. No. 788,972

Claims priority, application Japan, Oct. 19, 1984, 59-218518; Oct. 19, 1984, 59-218519

Int. Cl.[4] A61K *31/10, 31/165;* **C07C** *149/40, 149/41*

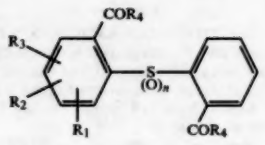
U.S. Cl. 514—563 **9 Claims**

1. A compound of the formula:



wherein n is an integer of 0 to 2; R_1 and R_3 which may be the same or different each represents a hydrogen atom, a halogen aton, a lower alkyl group, a lower alkoxy group or a nitro group; R_4 is a hydroxyl group or the group —NHZ, Z being a hydrogen atom or a lower alkyl group, excepting both the case where n is 0 or 1, any one of R_1 to R_3 is 5-chloro, 5-methoxy or 5-nitro and the remainder is a hydrogen atom, and R_4 is a hydroxyl group, and the case where n is 0 or 1, any two substituents of R_1 to R_3 are 3,5-dichloro or 3,5-dinitro and the remainder is a hydrogen atom, and R_4 is a hydroxyl group or an alkali metal salt hereof.

9. A pharmaceutical compositon for controlling infectious diseases, which comprises a pharmaceutically acceptable carrier an an effective amount of a compound of the formula:



wherein n is an integer of 0 to 2; R_1 to R_3 which may be the same or different each represents a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group or a nitro group; and R_4 is a hydroxyl group or the group —NHZ, Z being a hydrogen atom or a lower alkyl group, or an alkali metal salt thereof.

4,698,365

PESTICIDAL BENZOYLUREA COMPOUNDS

Martin Anderson, Whitstable, England, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

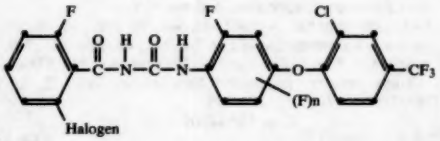
Continuation of Ser. No. 719,791, Apr. 4, 1985, abandoned. This application Nov. 25, 1986, Ser. No. 935,155

Claims priority, application United Kingdom, Apr. 10, 1984, 8409240; Aug. 17, 1984, 8420930

Int. Cl.[4] C07C *145/04;* **A01N** *47/34*

U.S. Cl. 514—594 **6 Claims**

1. A compound of the formula



in which "halogen" represents chlorine or fluorine and n is zero, one, two or three.

4. An insecticidal or acaricidae composition comprising Rule 126 an insecticidally or acaricidally effective amount of the compound of claim 1 together with a carrier.

4,698,366

METHOD FOR THE MANUFACTURE OF INSULATING POROUS SHAPED BUILDING ARTICLES

Dirk Laan, Amsterdam, Netherlands, assignor to Stichting IWL, Amsterdam, Netherlands

PCT No. PCT/NL85/00008, § 371 Date Dec. 2, 1985, § 102(e) Date Dec. 2, 1985, PCT Pub. No. WO85/03503, PCT Pub. Date Aug. 15, 1985

PCT Filed Feb. 5, 1985, Ser. No. 787,804

Claims priority, application Netherlands, Feb. 9, 1984, 8400426

Int. Cl.[4] C08J *9/22*

U.S. Cl. 521—55 **8 Claims**

1. A method for the manufacture of insulating, porous, shaped articles, comprising the steps of:

mixing expanded plastic foam spheres with a binder which comprises a bituminous product which can adhere to the plastic foam spheres to cement;

adding a granular or powdery material to the mixture of expanded plastic foam spheres and binder;

compounding the mixture containing the granular or powdery material, the expanded plastic foam spheres and binder;

adding a proteinaceous foaming agent to the mixture;

adding cement to the mixture;

adding water to the mixture;

compounding the mixture a second time to mix in the proteinaceous foaming agent, the cement and the water;

compressing the mixture into the desired shape of the article being manufactured; and drying the compressed mixture.

4,698,367

EXPANDABLE THERMOPLASTIC RESIN PARTICLES

Toshiki Ikeda, Otsu; Yoshitugu Beppu, Shiga; Takashi Yamamoto, Yokohama; Hideyo Ishigaki, and Hiroshi Ohmura, both of Aichi, all of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara and Nippon Oil and Fats Co., Ltd., Tokyo, both of, Japan

Filed Dec. 30, 1986, Ser. No. 947,738

Claims priority, application Japan, Dec. 30, 1985, 60-297500

Int. Cl.[4] C08J 9/22

U.S. Cl. 521—57 10 Claims

1. Expandable thermoplastic resin particles comprising a thermoplastic resin and a hydrocarbon having the lower boiling point than the softening point of the thermoplastic resin in which a copolymer composed of a fluorinated vinyl polymer part and a hydrophilic vinyl polymer part covers or is included on the surface or in the surface layer of the expandable thermoplastic particle wherein said copolymer of 20–80 w/w % of a flourinated vinyl polymer part and 80–20 w/w % of a hydrophilic vinyl polymer part.

4,698,368

MIXTURES OF ORGANO-TIN COMPOUNDS

Horst Müller, Fürth/Odenwald, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

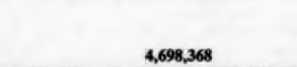
Continuation of Ser. No. 301,674, Sep. 14, 1981, abandoned, which is a continuation of Ser. No. 122,786, Feb. 19, 1980, abandoned. This application Jan. 30, 1984, Ser. No. 575,482

Claims priority, application Switzerland, Feb. 22, 1979, 1787/79; Dec. 7, 1979, 10872/79

Int. Cl.[4] C08K 5/58

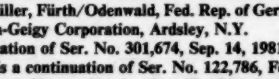
U.S. Cl. 521—93 8 Claims

1. A mixture comprising an organo-tin mercaptide of the formula II



(II)

and an organo-tin carboxylate of the formula V



(V)

wherein R^1 is C_1–C_{12}alkyl, X is sulfur or oxygen, R^4 is $-S-CH_2CH_2-COOR^5$ or $-X-Sn(R^1)_n(S-CH_2CH_2-COOR^5)_{3-n}$, in which R^1 and X are as defined above, R^5 is C_8–C_{14}alkyl, n is 1 or 2, and R^6 is C_{10}–C_{30}alkyl, and the weight ratio of II:V is in the range from 9:1 to 1:9.

4,698,369

FLEXIBLE, FLAME-RETARDANT POLYURETHANE FOAMS

Raymond W. H. Bell, Crickhowell, Wales, assignor to Dunlop Limited a British Company, United Kingdom

Filed Jun. 18, 1986, Ser. No. 875,705

Int. Cl.[4] C08G 18/14

U.S. Cl. 521—99 12 Claims

1. A method for the production of a flexible, flame-retardant polyurethane foam by reacting in a foam-forming reaction mixture a polymeric polyol, an organic polyisocyanate and an effective amount of expandable graphite, wherein said expandable graphite contains one or more exfoliating agents.

4,698,370

PRODUCTION OF PHENOLIC RESIN COMPOSITE FOAM

Yukio Saeki; Naomitsu Inoue, and Yukio Tokunaga, all of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

Filed Apr. 14, 1986, Ser. No. 851,185

Int. Cl.[4] C08J 9/10

U.S. Cl. 521—128 8 Claims

1. A process for producing a phenolic resin composite foam which comprises heating at 100 to 250° C. a phenolic resin composite foam material which is composed of a powdered novolak phenolic resin having a number-average molecular weight of 250 to 600, a bulk density of 0.15 to 0.50 and containing 1 to 10% of free phenol; a chemically decomposing blowing agent; at least one kind of blowing auxiliary selected from the group consisting of urea, formic acid, oxalic acid, maleic acid, fumaric acid, benzoic acid, salicylic acid, p-hydroxybenzoic acid, and phthalic acid incorporated in an amount of 0.1 to 7 parts of weight per 100 parts by weight of the phenolic resin,and inorganic foamed particles incorporated in a ratio of phenolic resin to inorganic foamed particles from 90:10 to 10:90 by weight.

4,698,371

PROCESS FOR THE PREPARATION OF OPTIONALLY CELLULAR POLYURETHANE-POLYUREA MOLDED PARTS USING URETHANE GROUP- AND ISOCYANURATE GROUP-CONTAINING 2,4- AND/OR 2,6-TOLUENE DIISOCYANATES

Frank Werner, Neustadt; Matthias Marx, Bad Durkheim, and Hans U. Schmidt, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 26, 1985, Ser. No. 780,410

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1984, 3436098

Int. Cl.[4] C08J 9/14

U.S. Cl. 521—131 11 Claims

1. A process for the preparation of a cellular or noncellular polyurethane-polyurea molded article using closed mold one-shot reaction injection molding techniques comprising reacting

(a) a urethane and isocyanurate modified 2,4-and/or 2,6-toluene diisocyanate having an isocyanate content of from 28 to 45 percent by weight, based on total weight of the modified isocyanate,

(b) a higher molecular weight compound having at least two reactive hydrogen atoms, having a functionality of from 2 to 8 and a molecular weight of from 1000 to 8000, and

(c) an aromatic diamine, in the presence of

(d) a catalyst, and optionally

(e) a low molecular weight polyfunctional polyhydroxyl compound having a functionality of from 2 to 4 and a molecular weight less than 500,

(f) a blowing agent,

(g) an auxiliary and/or additive.

11. The article prepared by the process of claim 1.

4,698,372

MICROPOROUS POLYMERIC FILMS AND PROCESS FOR THEIR MANUFACTURE

Arthur Z. Moss, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 9, 1985, Ser. No. 774,024

Int. Cl.[4] C08F 14/00; C08J 9/00; B29C 67/20, 55/10

U.S. Cl. 521—145 58 Claims

1. A microporous, tear resistant film substantially free of cracks detectable with an electron microscope and having a water vapor permeability of at least

$$1.1 \times 10^{-5} \frac{kg/m^2 \cdot sec}{MPa/cm}$$

according to ASTM 96-66BW (inverted cup method) and possessing hydrostatic resistance to the penetration of liquid water of at least 0.25 kPa, said film being made by a process comprising a stretching at a temperature no higher than about 10° C. above the Vicat softening point but at least 10° C. above the glass transition temperature of the matrix polymer a precursor film having at most very low porosity and consisting essentially of the following components:

(a) a matrix of a thermoplastic orientable polymer characterized by

(1) a hydrophobic surface, as indicated by a contact angle between said surface and a droplet of water of at least about 40°;

(2) a glass transition temperature, Tg, of less than about 25° C.;

(3) a Vicat softening point, Tv, of more than about 25° C.;

(4) ultimate elongation at some temperature between Tg and Tv of at least 100%; and

(5) a flexural modulus at 25° C. of less than about 200 MPa;

said thermoplastic orientable matrix polymer being a polymer selected from the group consisting of ethylene copolymers and copolyesters;

(b) about 20–40%, based on the volume of the final composition, of a particulate filler chemically nonreactive with the polymer matrix and dispersed therein by melt-blending, said filler being characterized by

(1) a sufficiently high softening temperature to avoid particle distortion at the lowest temperature at which the matrix polymer is sufficiently fluid to be satisfactorily melt-blended;

(2) an aspect ratio of less than about 3;

(3) an average equivalent spherical diameter of about 0.05–50 μm;

(4) an at most negligible electrostatic or dipole attraction to the matrix polymer; and

(5) a surface tension which either has at the lowest temperature at which the matrix polymer is sufficiently fluid to be satisfactorily melt-blended a value at most about equal to that of the matrix polymer of can be corrected to have under the blending conditions at most such a value by the adsorption on its surface of a third component (c);

said component (c) being an organic compound, which is liquid at the lowest temperatue at which the matrix polymer is sufficiently fluid to be melt-blended and is capable at that temperature of being adsorbed on the surface of filler (b) to the extent of at least about 0.5×10^{-5} mole of component (c) per square meter of surface area of filler (b), as calculated from the average equivalent spherical diameter of filler (b), and being present in the blend in an amount at least sufficient to satisfy this requirement; said component (c) being characterized by

(1) at most negligible solubility in the matrix polymer at the melt-blending temperature;

(2) chemical inertness to the matrix polymer;

(3) a number average moelcular weight of about 100–10,000; and

(4) a surface tension which at the temperature at which component (c) is liquid has a value at most about equal to that of the matrix polymer;

and recovering the resulting microporous film.

4,698,373

STABLE ONE PART DENTAL COMPOSITIONS EMPLOYING IPN TECHNOLOGY

Louis Tateosian, York, Pa., and Frederick D. Roemer, Bloomington, Ind., assignors to Dentsply Research & Development Corp., Milford, Del.

Continuation of Ser. No. 227,138, Jan. 21, 1981, abandoned, which is a continuation-in-part of Ser. No. 8,507, Feb. 1, 1979, abandoned. This application Apr. 30, 1984, Ser. No. 605,629

The portion of the term of this patent subsequent to Aug. 2, 2000, has been disclaimed.

Int. Cl.[4] C08F *2/50, 257/00, 261/00;* **A61C** *13/01*

U.S. Cl. 522—95 **32 Claims**

1. A hardenable composition comprising a blend of:

monofunctinal polymerizable monomer,

di- or polyfunctional crosslinking agent reactive with said polymerizable monomer, and

from about 10% to about 70% of a crosslinked polymer in the form of discrete particles having average diameters up to about 500 microns,

said crosslinked polymer particles being sufficiently well crosslinked as to maintain substantially their structural identity when exposed to the monomers component,

said crosslinked polymer particles being capable of swelling with or imbibing at least 10% by weight of the particles of said monomer component,

said particles being substantially swollen by said monomer and said crosslinking agent;

said composition being capable of being hardened into a water insensitive object.

4,698,374

OPTICAL LENS SYSTEM INCORPORATING MELANIN AS AN ABSORBING PIGMENT FOR PROTECTION AGAINST ELECTROMAGNETIC RADIATION

James M. Gallas, 4934 Timberwind, San Antonio, Tex. 78250

Continuation-in-part of Ser. No. 618,745, Jun. 8, 1984, abandoned. This application May 30, 1985, Ser. No. 739,556

Int. Cl.[4] C08L *89/04*

U.S. Cl. 523—106 **16 Claims**

1. An optical lens system for protecting the eye from ultraviolet, visible and near-infrared radiation, comprising:

a substrate; and

melanin;

said substrate and said melanin forming a solid, clear and transparent lens.

4,698,375

COMPOSITES OF UNSINTERED CALCIUM PHOSPHATES AND SYNTHETIC BIODEGRADABLE POLYMERS USEFUL AS HARD TISSUE PROSTHETICS

Linneaus C. Dorman, Midland, Mich., and Paul A. Meyers, Dublin, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 702,998, Feb. 19, 1985, Pat. No. 4,636,526. This application Oct. 2, 1986, Ser. No. 914,419

Int. Cl.[4] C08L *67/04*

U.S. Cl. 523—115 **8 Claims**

1. A composite material consisting essentially of from about 25 to about 75 percent by weight of an unsintered calcium phosphate biomaterial and about 75 to about 25 percent by weight of synthetic boidegradable polymer is selected from the group consisting of a polyester of glycolic acid, a polyester of lactic acid, polyhydroxybutyrate, an α-amino acid polymer, and mixtures thereof.

4,698,376

COATING MATERIAL FOR COLLAGEN-CONTAINING MATERIALS

Erik Asmussen, Farum, and Christian Munksgaard, Kokkedal, both of Denmark, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 14, 1986, Ser. No. 839,758

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1985, 3510611

Int. Cl.[4] A61K *6/08*

U.S. Cl. 523—115 9 Claims

1. A coating composition or lacquer for improving the bonding between collagen-containing material and hardening polymeric materials consisting essentially of an active ketone selected from optionally substituted cycloaliphatic ketones, wherein aliphatic 5- to 7- membered rings and/or aromatic rings may be fused onto the cycloaliphatic ring or aromatic ketones having one or more aryl groups, an ester of acrylic or methacrylic acid having an active hydrogen and water and/or a physiologically suitable solvent.

4,698,377

BINDER COMPOSITIONS CONTAINING PHENOLIC RESINS AND ESTERS OF ALKOXY ACIDS

Robert A. Laitar, Woodridge, Ill., assignor to Acme Resin Corporation, Westchester, Ill.

Filed Sep. 26, 1986, Ser. No. 911,866

Int. Cl.[4] C08K *5/10;* C08L *61/10, 75/04*

U.S. Cl. 523—143 25 Claims

1. A binder composition comprising (A) a phenolic resin component including at least one phenolic resin selected from the group consisting of phenolic resole resins and phenolic novolak resins, sufficient solvent to reduce the viscosity of said phenolic resin component to below about 1000 centipoises, said solvent comprising a liquid ester of an alkoxyaliphatic carboxylic acid, (B) an isocyanate component having a functionality of two or more and (C) sufficient catalyst to catalyze the reaction between components (A) and (B).

2. A binder composition according to claim 1 wherein the liquid ester of an alkoxyaliphatic acid has the general formula:

$$RO(CH_2)_nCHR^2CO_2R^1$$

wherein R and R^1 are alkyl groups having 1 to 8 carbon atoms, R^2 is hydrogen or an alkyl group having from 1 to 4 carbon atoms, n is zero or a small positive integer, and the phenolic resin forms a homogenous solution at room temperature with the solvent.

4,698,378

PROCEDURE FOR THE CONTINUOUS PRODUCTION OF FREE FLOWING AND HOMOGENOUS MIXTURES OF PLASTIC MATERIALS WITH ADMIXTURES

Werner Wehrli, Basel, and Peter Franz, Birsfelden, both of Switzerland, assignors to Buss AG, Basel, Switzerland

PCT No. PCT/CH82/00135, § 371 Date Aug. 6, 1984, § 102(e) Date Aug. 6, 1984, PCT Pub. No. WO84/02530, PCT Pub. Date Jul. 5, 1984

Continuation-in-part of Ser. No. 642,917, Aug. 6, 1984, abandoned. This PCT application Dec. 20, 1982, Ser. No. 783,339

Int. Cl.[4] C08J *3/22*

U.S. Cl. 523—318 16 Claims

1. Process for a continuous conversion of granulated PVC material and additive substances to a free-flowing pre-blend, comprising in combination the steps of:

mechanically intermixing at room temperature the PVC material and additive substances in a first zone continuously transversed thereby to provide a macroscopically homogeneous admixture thereof;

melting said additive substances in a subsequent second zone; and

absorbing the molten additive substances with said granulated PVC material in a subsequent third zone to provide said free-flowing pre-blend.

4,698,379

MAGNESIUM HYDROXIDE, PROCESS FOR ITS PRODUCTION AND RESIN COMPOSITION CONTAINING IT

Kelichi Nakaya, Chiba; Kunio Tanaka, Ichihara; Fukuo Kanno, and Mitaka Kobayashi, both of Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Jan. 16, 1986, Ser. No. 819,409

Claims priority, application Japan, Jan. 19, 1985, 60-6707; Jan. 19, 1985, 60-6708

Int. Cl.[4] C01F *5/16*

U.S. Cl. 523—513 15 Claims

1. Magnesium hydroxide of a substantially spherical particle form having an average particle size of from 5 to 500 μm and a specific surface area of from 25 to 1 m^2/g.

9. A process for producing magnesium hydroxide, which comprises reacting an aqueous solution containing a water-soluble magnesium salt, with ammonia while controlling the load for crystallization of magnesium hydroxide at a level of not higher than 500 kg/m^3. hr and the magnesium hydroxide slurry concentration in the crystallization apparatus at a level of from 1 to 60% by weight, to have magnesium hydroxide crystallized as substantially spherical particles having an average particle size of from 5 to 500 μm and a specific surface area of from 25 to 1 m^2/g.

4,698,380

FLUID LOSS CONTROL IN WELL CEMENT SLURRIES

David N. Roark; Adam Nugent, Jr., and Baldev K. Bandlish, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 779,140, Sep. 23, 1985, Pat. No. 4,657,948, which is a continuation-in-part of Ser. No. 732,096, May 9, 1985. This application Dec. 22, 1986, Ser. No. 945,432

Int. Cl.[4] C08K *3/00*

U.S. Cl. 524—2 16 Claims

1. A dry cement formulation adapted for producing an aqueous well cement slurry for use in cementing subterranean well formations, which formulation comprises in combination, an anhydrous mixture of (i) uncured cement, (ii) a sulfonated polymer, and (iii) a polymer of monoallylamine; components (ii) and (iii) being capable of producing and being present in an amount sufficient to produce, upon the addition of water, a gelatinous material that tends to plug porous zones and minimize premature water loss from the well cement slurry when present in the subterranean well formation.

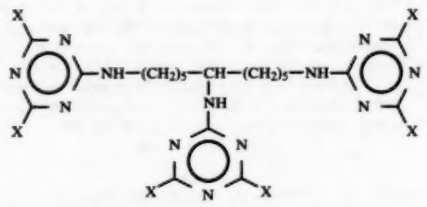
4,698,381

N,N',N''-TRIS(2,2,6,6-TETRAMETHYL-4-PIPERIDYL)-TRIAZINYL) UNDECANE TRIAMINES AS STABILIZERS FOR SYNTHETIC POLYMERS

Motonobu Minagawa, Koshigaya; Yutaka Nakahara, Okegawa; Toshihiro Shibata, Omiya, and Ryozo Arata, Urawa, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

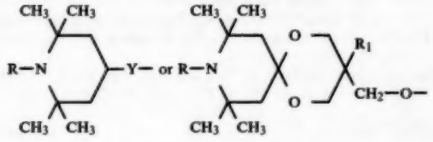
Filed Sep. 19, 1985, Ser. No. 778,357
Claims priority, application Japan, Sep. 28, 1984, 59-203597
Int. Cl.[4] C08K 5/34
U.S. Cl. 524—100 **34 Claims**

1. N,N',N''-tris((2,2,6,6-tetramethyl-4-piperidyl)triazinyl)undecane triamines having the formula:



wherein:

X is selected from the group consisting of



in which:

R is selected from the group consisting of hydrogen; oxyl O; alkyl having from one to about eighteen carbon atoms; hydroxyalkyl having from two to about eight carbon atoms; epoxyalkyl having from three to about eight carbon atoms; alkaryl having from seven to about twelve carbon atoms; and acyl having from one to about eight carbon atoms;

Y is O or NR_2;

R_1 is alkyl having from one to about six carbon atoms; and

R_2 is hydrogen or alkyl having from one to about eighteen carbon atoms.

4,698,382

PLASTICIZED POLY(VINYL FLUORIDE)

George R. McClure, Claymont, and Eustathios Vassiliou, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 30, 1986, Ser. No. 914,152
Int. Cl.[4] C08J 5/09
U.S. Cl. 524—292 **7 Claims**

1. A composition of poly(vinyl fluoride) plasticized with a plasticizer selected from the group consisting of

trimethyltrimellitate,

triethyltrimellitate,

di(methoxyethyl)phthalate, and

di(methoxyethoxyethyl)phthalate.

4,698,383

LIQUID COPOLYESTER PLASTICIZERS DERIVED FROM 1,4-BUTANEDIOL AND A DICARBOXYLIC ACID MIXTURE

William J. Mertz, and William L. O'Brien, both of Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Division of Ser. No. 894,170, Aug. 7, 1986. This application Mar. 9, 1987, Ser. No. 23,319
Int. Cl.[4] C08J 5/11
U.S. Cl. 524—314 **5 Claims**

1. A flexible PVC resin composition containing 40 to 70 parts by weight, per 100 parts resin, of a liquid copolyester plasticizer having a solidification point less than 20° C., 100° F. kinematic viscoisty of 350 to 1250 centistokes, acid value less than 3, hydroxyl value less than 25, and obtained by the esterification of an alcohol component consisting of 1,4-butanediol and an aliphatic saturated monofunctional alcohol having from 6 to 13 carbon atoms with an acid component which is a mixture of saturated aliphatic dicarboxylic acids, said mixture containing

(a) from 40 to 60 weight percent C_5 dicarboxylic acid or methyl ester thereof;

(b) from 40 to 60 percent by weight C_6 and C_{9-11} dicarboxylic acids or methyl esters thereof present in a ratio from 1:1 to 1:4; and

(c) 10 percent or less other dicarboxylic acids in the range C_{4-15} or methyl esters thereof, exclusive of the C_5, C_6, and C_{9-11} dicarboxylic acids.

4,698,384

NONWOVEN BINDER EMULSIONS OF VINYL ACETATE/ETHYLENE COPOLYMERS HAVING IMPROVED SOLVENT RESISTANCE

Chung-Ling Mao, Emmaus, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 19, 1986, Ser. No. 831,015
Int. Cl.[4] C08F 2/16
U.S. Cl. 524—458 **14 Claims**

1. In a copolymer emulsion comprising an aqueous medium having colloidally dispersed therein a copolymer consisting essentially of vinyl acetate, 5–35 wt % ethylene and 2 to 10 wt % of an amide functional crosslinking comonomer which is N-methylolacryl-amide or a comonomer of formula I

$$R—NH—(CH_2)_n—CH(OR')_2 \quad (I)$$

where R is acryloyl or methacryloyl, R' is a C_{1-C4} alkyl group, and n is 3 or 4, the improvement comprising the preparation of the copolymer emulsion in the presence of 0.1 to 1 wt % polyvinyl pyrrolidone, based on vinyl acetate in the copolymer.

4,698,385

BINDER FOR HIGH SOLIDS AMBIENT CURE COATINGS

Frederick J. Schindler, Ft. Washington, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Feb. 23, 1984, Ser. No. 581,766
Int. Cl.[4] C08F 4/20
U.S. Cl. 524—733 **14 Claims**

1. A composition suitable as a binder for high solids ambient cure coatings comprising about 25 to 95% by weight of binder of a polyunsaturated monomer having an average of greater than two double bonds per molecule, said monomer being selected from esters of acrylic acid and acryloxypropionic acid; about 5 to 15% by weight of binder of a multifunctional mercaptan; and a vanadium compound providing about 0.001 to 0.15% by weight of binder of vanadium.

4. The composition of claim 1 further including about 0.1 to 30% by weight of a polymer, which is compatible with said composition, selected from the group consisting of chlorinated

rubber, acrylic copolymers with ureido functionality, vinyl chloride/vinyl acetate copolymers and cellulose esters.

4,698,386

POLYORGANOSILOXANE COMPOSITIONS

Tetsuo Fujimoto, Ohta, Japan, assignor to Toshiba Silicone Company, Ltd., Japan

Filed May 28, 1986, Ser. No. 868,228
Claims priority, application Japan, Aug. 26, 1985, 60-185822
Int. Cl.[4] C08L *83/04*
U.S. Cl. 524—862 12 Claims

1. A polyorganosiloxane composition comprising:

(A) a linear and/or branched polyorganosiloxane (A), with a viscosity of 50 to 100,000 cP at 25° C., wherein 0.7 to 1.8 silicon-bonded vinyl radicals, on average, are present in each molecule, and the remaining organic radicals bonded to a silicon atom are substituted or unsubstituted monovalent hydrocarbon radicals which do not include unsaturated aliphatic radicals, and 30% or more portion of the molecules have only one silicon-bonded vinyl radical in the molecule;

(B) a polyorganohydrogensiloxane (B), wherein more than two silicon-bonded hydrogen atoms, on average, are present in each molecule and the remaining organic radicals bonded to a silicon atom are substituted or unsubstituted monovalent hydrocarbon radicals which do not include unsaturated aliphatic radicals, in an amount such that the number of silicon-bonded hydrogen atoms may be 0.5 to 5 per vinyl radical in polyorganosiloxane (A);

(C) a catalytic amount of platinum compound; and

(D) a dye selected from the group consisting of anthraquinone dye and azo dye in an amount from 1 to 2,000 ppm based on polyorganosiloxane (A).

4,698,387

ALLOSTERIC CONJUGATES OF HEMOGLOBIN AND USE AS BLOOD SUBSTITUTES

Karl-Heinz Schmidt, Wankheim, and Wolfgang Feller, Meisungen, both of Fed. Rep. of Germany, assignors to Intermedicat GmbH, Emmenbrucke, Switzerland

Filed Oct. 26, 1984, Ser. No. 665,354
Claims priority, application Fed. Rep. of Germany, Nov. 10, 1983, 3340592
Int. Cl.[4] C07G *7/00*; C07C *103/52*; A61K *37/00, 31/71*
U.S. Cl. 525—54.1 26 Claims

1. An allosterically active conjugate composition of hemoglobin which comprises at least one tetramer of hemoglobin and at least one adduct of a physiologically acceptable polymeric agent non-toxic to biological systems covalently linked to at least one ligand such that the adduct is bound to the allosteric binding site of the hemoglobin in a reversible, non-covalent manner and the ligand does not contain any reactive functional group that would be capable of reacting covalently with the hemoglobin.

4,698,388

METHOD FOR MODIFYING THE SURFACE OF POLYMER MATERIALS

Hiroshi Ohmura; Yoshihiro Oshibe, both of Chita; Masaharu Nakayama, Nagoya, and Takashi Yamamoto, Yokohama, all of Japan, assignors to Nippon Oil & Fats Co., Japan

Division of Ser. No. 601,577, Apr. 18, 1984, Pat. No. 4,604,425.
This application Feb. 18, 1986, Ser. No. 829,934
Claims priority, application Japan, Apr. 30, 1983, 58-74959
Int. Cl.[4] C08L *9/00, 31/00, 53/00*
U.S. Cl. 525—88 3 Claims

1. A method for modifying the surface of a natural polymer material, comprising adding a block copolymer consisting of a polymer portion compatible with the natural polymer material and a hydrophilic polymer portion to the natural polymer material,

said block copolymer having been produced through the following first and second steps,

in the first step, either a vinyl monomer which forms a hydrophilic polymer, or a vinyl monomer which forms a polymer compatible with the polymer material, is polymerized in the presence of a polymeric peroxide as a polymerization initiator to produce a peroxy bond containing polymer, and

in the second step, either a vinyl monomer which forms a hydrophilic polymer, or a vinyl monomer which forms a polymer compatible with the natural polymer material, both the vinyl monomers being used in such a manner that, when a hydrophilic polymer is produced in the first step, a vinyl monomer which forms a polymer compatible with the natural polymer material is used in the second step, and when a polymer compatible with the natural polymer material is produced in the first step, a vinyl monomer which forms a hydrophilic polymer is used in the second step, is polymerized in the presence of a polymerization initiator of the peroxy bond- or azo bond-containing natural polymer obtained in the first step.

4,698,389

METHOD OF FORMING A NONAQUEOUS STABLE EMULSION OF RUBBER IN POLYMERIZABLE MONOMER, AND THE POLYMERIZATION PROCESS AND THERMOPLASTIC COPOLYMER PRODUCED THEREBY

Wen B. Shyu, Chagrin Falls, Ohio; David A. Woodhead, South Glamorgan, United Kingdom, and Vincent P. Quigley, Maple Heights, Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 705,266, Feb. 25, 1985, Pat. No. 4,552,921.
This application Jun. 6, 1985, Ser. No. 741,913
Int. Cl.[4] C08L *53/00*
U.S. Cl. 525—96 11 Claims

1. A rubber-modified transparent thermoplastic copolymer composition comprising a monoalkenyl aromatic monomer, an unsaturated dicarboxylic acid anhydride monomer, a C_1 to C_3 alkyl ester of methacrylic acid monomer, a rubber and a block copolymer having at least one component miscible with said monomers and at least one component miscible with said rubber wherein said rubber modified copolymer is prepared by polymerizing a single nonaqueous emulsion feedstock comprising each said monomer, said rubber and said block copolymer.

4,698,390

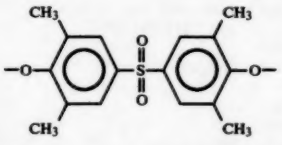
MISCIBLE BLENDS OF POLYCARBONATE WITH VINYL CHLORIDE DERIVED POLYMERS

Lloyd M. Robeson, Whitehouse Station; James E. Harris; James H. Kawakami, both of Piscataway, and Louis M. Maresca, Belle Mead, all of N.J., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 591,606, Mar. 20, 1984, abandoned.
This application Apr. 10, 1986, Ser. No. 851,280
Int. Cl.[4] C08F *8/00*
U.S. Cl. 525—133 4 Claims

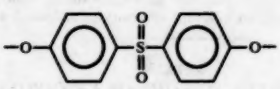
1. A molding composition comprising a compatible blend of:

(a) a polycarbonate containing repeating units (I) having the formula:



(I)

and, optionally, repeating units (II) having the formula:



(II)

in which repeating units (I) and optionally repeating units (II) are connected by interbonding units derived from a carbonate precursor, and (b) a vinyl chloride derived polymer.

4,698,391

CROSSLINKED POLYMERS WITH LOWERED RESISTIVITY AND MATERIALS AND METHODS FOR THEIR PREPARATION

Paul D. Yacobucci, and Thomas Albano, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 30, 1986, Ser. No. 892,173

Int. Cl.[4] C08L *61/00*

U.S. Cl. 525—162 **11 Claims**

1. A combination of materials comprising:

a polymer containing at least one functional moiety capable of reacting to bond to a crosslinking agent,

a crosslinking agent for the polymer, and

a conductivity agent containing a quaternary ammonium moiety and being capable of reacting with the crosslinking agent or the polymer to bond covalently and pendently to the crosslinking agent or the polymer, during a process of crosslinking the polymer through the crosslinking agent.

4,698,392

BLEND OF CHLORINATED POLYOLEFIN ELASTOMER AND ETHYLENE-CONTAINING TERPOLYMER

Richard T. Chou, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 2, 1986, Ser. No. 859,174

Int. Cl.[4] C08L *73/00, 81/00*

U.S. Cl. 525—189 **9 Claims**

1. A curable polyomeric composition exhibiting good low temperature flexibility consisting essentially of (a) about 50–90 parts by weight of a chlorinated polyolefin elastomer of chlorinated polyethylene or chlorosulfonated polyethylene containing from about 30–50 weight percent chlorine, and (b) about 10–50 parts by weight of an ethylene terpolymer of 48–74 weight percent ethylene, 20–40 weight percent alkyl acrylate wherein the alkyl group contains 4–9 carbon atoms, and 6–12 weight percent carbon monoxide or sulfur dioxide.

4,698,393

PREPARATION OF POLY(ARYLENE ETHER KETONES)

Viktors Jansons, Los Gatos; Heinrich C. Gors, Mountain View; Stephen Moore, Redwood City; Robert H. Reamey, Menlo Park, and Paul Becker, San Francisco, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 790,029, Oct. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 762,011, Jul. 31, 1985, abandoned, which is a continuation of Ser. No. 648,119, Sep. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 594,503, Mar. 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 481,083, Mar. 31, 1983, abandoned. This application Oct. 23, 1986, Ser. No. 922,781

Int. Cl.[4] C08F *4/00, 293/00*

U.S. Cl. 525—242 **20 Claims**

20. A block copolymer of the formula

$$[AB]_bA_c \text{ or } [BA]_bB_c$$

wherein b is 1 to 20; c is 0 or 1, A is a polymeric moiety comprising repeat units derived from a member of the group consisting of 4-chlorostyrene, 3,4-dichlorostyrene or 2,6-dichlorostyrene and B is a polymer moiety comprising repeat units derived from a member of the group consisting of 2-vinylpyridene, 4-vinylpyridine, mathylmethacrylate, acrylonitrile and methacrylonitrile.

4,698,394

REACTIVE STYRENE POLYMERS

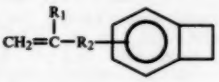
Pui K. Wong, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 23, 1985, Ser. No. 812,431

Int. Cl.[4] C08F *12/32, 212/32, 279/02*

U.S. Cl. 525—289 **19 Claims**

1. A solid random copolymer comprising from about 99.99 to about 80 mole percent of a monoalkenyl arene monomer and from about 0.01 to about 20 mole percent, based on total moles of incorporated monoalkyl arene and olefinic benzocyclobutene monomers, of an olefinic benzocyclobutene monomer of the formula:



where R_1 is hydrogen or CH_3 and R_2 is $(CH_2)_n$ where n is 0 to 6.

4,698,395

PROCESS OF PURIFYING MALEIC ANHYDRIDE-MODIFIED POLYOLEFIN

Takayuki Inoue; Masafumi Hattori; Kazuhide Hayama, and Riichiro Maruta, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed May 14, 1986, Ser. No. 863,191

Claims priority, application Japan, May 20, 1985, 60-107276

Int. Cl.[4] C08F *8/42, 8/44*

U.S. Cl. 525—327.8 **9 Claims**

1. A process of purifying maleic anhydride graft polyolefin, comprising the steps of:

adding an aqueous solution of alkali metal hydroxide to a solution of maleic anhydride graft polyolefin containing unreacted maleic anhydride which is dissolved in an organic solvent at a temperature from 80° C. to 160° C., thereby precipitating maleic anhydride graft polyolefin particles to make a W/O emulsion;

stirring said W/O emulsion while maintaining the temperature at the same temperature as above for less than 2 hours, thereby selectively forming the alkali metal salt of unreacted maleic anhydride;

adding said aqueous solution of alkali metal hydroxide to said W/O emulsion to change said W/O emulsion into an O/W emulsion;

separating said maleic anhydride graft polyolefin particles; and

washing said maleic anhydride graft polyolefin particles with water.

4,698,396

HARDENABLE SYNTHETIC RESIN MIXTURES

Manfred Drawert, Froendenberg; Horst Krase, Hamm, and Hans D. Skoda, Kamen, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Apr. 28, 1986, Ser. No. 856,345

Claims priority, application Fed. Rep. of Germany, May 11, 1985, 3517013

Int. Cl.[4] C08L *63/00, 77/08*

U.S. Cl. 525—420.5 **10 Claims**

1. A coating or printing composition comprising a non-aromatic solvent or solvent mixture and, as a binder, a hardenable synthetic resin mixture comprising

(A) a glycidyl compound having more than one epoxy group per molecule and an epoxy value from 0.4 to 0.7;

(B) a solid synthetic resin component having free amino groups which is an adduct formed between
(1) an excess of a polyaminoamide in turn formed between
(a) a dimeric fatty acid,
(b) ethylenediamine, and
(c) a diamine which is a member selected from the group consisting of aliphatic diamines having from 3 to 20 carbon atoms, such aliphatic amines wherein the carbon chain is interrupted by at least one oxygen atom to form an oxa-compound, cycloaliphatic diamines having 5 or 6 ring members, and heterocyclic diamines having 5 or 6 ring members, and
(2) a glycidyl compound having more than one epoxy group per molecule and an epoxy value from 0.4 to 0.7,
in which resin component (B) the ratio of (B)(1)(b) to (B)(1)(c) may range from 0.95:0.05 to 0.5:0.5 and from 0.05 to 0.30 equivalent of amine hydrogen atoms of polyaminoamide (B)(1) have been preadducted by reaction with glycidyl compound (B)(2); and
(C) a solid polyamide formed between
(1) a dimeric fatty acid,
(2) ethylenediamine, and
(3) a diamine which is a member selected from the group consisting of aliphatic diamines having from 3 to 20 carbon atoms, such aliphatic amines wherein the carbon chain is interrupted by at least one oxygen atom to form an oxa-compound, cycloaliphatic diamines having 5 or 6 ring members, and heterocyclic diamines having 5 or 6 ring members, and
(4) a short chain, linear aliphatic monocarboxylic acid in an amount from 0.4 to 0.8 equivalent, based on the total acid equivalents,
in which polyamide (C) the equivalent ratio of (C)(1) to (C)(2) is from 1.0:0 to 0.5:0.5 and substantially equivalent amounts of an acid component comprising compounds (C)(1) and (C)(4) and of a basic component comprising amino compounds (C)(2) and (C)(3) are reacted to form said polyamide (C),
in which mixture (A) and (B) are present in substantially equivalent amounts and the weight ratio (A)+(B):(C) is from 9:1 to 1.5:1.

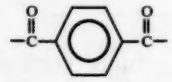
4,698,397

CHOLESTERIC LIQUID CRYSTAL COPOLYESTERS

Tomohiro Toya, Yokohama; Hajime Hara, Fujisawa; Shigeki Iida, and Tetsuo Satoh, both of Yokohama, all of Japan, assignors to Nippon Oil Company, Ltd., Tokyo, Japan

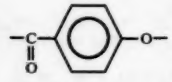
Filed Aug. 28, 1986, Ser. No. 901,660
Claims priority, application Japan, Sep. 4, 1985, 60-193823
Int. Cl.[4] C08G *63/76*
U.S. Cl. 525—437 **5 Claims**

1. A process for preparing a cholesteric liquid crystal copolyester consisting essentially of structural units represented by the following formula (A), (B), (C) and (D):

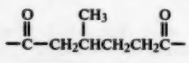


(A)

$-OCH_2CH_2O-$ (B)



(C)



(D)

which is optically active characterized in that a polyethylene terephthalate oligomer having a (B)/(A) mole ratio in the range of 1.1 to 1.8, p-acetoxybenzoic acid and 3-methyladipic acid are reacted to prepare the final cholesteric liquid crystal copolyester having an inherent viscosity of at least 0.4 dl/g.

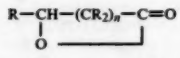
4,698,398

COATING COMPOSITION OF A HYDROXY FUNCTIONAL EPOXY POLYESTER GRAFT COPOLYMER

Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe Farms, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 14, 1985, Ser. No. 798,085
Int. Cl.[4] C08G *63/60, 63/08;* C08L *67/04, 63/02*
U.S. Cl. 525—437 **11 Claims**

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting coating composition, which copolymer has a number average molecular weight (M_n) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having a number average molecular weight (M_n) between about 1,000 and about 4,000, said precursor being the reaction product of diepoxide reacted substantially simultaneously with diphenol and dicarboxylic acid in chain extension reaction and acid component in chain termination reaction in approximately a 1 to 1 equivalent ratio with the chain extended reaction product, said acid component comprising primary hydroxy functional acid, said diepoxide being reacted substantially simultaneously with said diphenol and dicarboxylic acid in amounts sufficient to give a weight per epoxide of between about 500 and about 2,500, and wherein said polymerization of said lactone monomers is carried out at a temperature between about 50° C. and about 300° C. and the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers; wherein said lactone monomers are selected from those represented by the general formula:



in which n is at least 4, at least n+2 R's are hydrogen, and the remaining R's are substituents selected from the group consisting of alkyl, cycloalkyl, alkoxy and single ring aromatic hydrocarbon radicals.

4,698,399

CHIP RESISTANT PRIMER COMPOSITION I'

Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe Farms, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 14, 1985, Ser. No. 798,079
Int. Cl.[4] C08G *63/60, 63/08;* C08L *67/04, 63/02*
U.S. Cl. 525—449 **11 Claims**

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight ($\overline{M}_n$) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having a number average molecular weight ($\overline{M}_n$) of between about 1,000 and about 4,000, said precursor being the reaction product of diepoxide with dicarboxylic acid in chain extension reaction and acid component in chain termination reaction, in approximately a 1 to 1 equivalent ratio with the chain extended reaction product, said acid component comprising primary hydroxy functional acid, wherein said polymerization of said lactone monomers is carried out at a temperature between

about 50° C. and about 300° C. and the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers.

4,698,400

CHIP RESISTANT PRIMER COMPOSITION III

Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe Farms, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 16, 1985, Ser. No. 809,808

Int. Cl.[4] C08G *63/06, 63/08;* **C08L** *63/02*

U.S. Cl. 525—450 **10 Claims**

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight (M_n) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having a number average molecular weight (M_n) of between about 1,000 and about 4,000, said precursor being the reaction product of diepoxide with aliphatic diol in chain extension reaction and acid component in chain termination reaction in approximately a 1 to 1 equivalent ratio with the chain extended reaction product, said acid component comprising primary hydroxy functional acid, wherein said polymerization of said lactone monomers is carried out at a temperature between about 50° C. and about 300° C. and the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers.

4,698,401

POLYFUNCTIONAL PHENOLIC REACTION PRODUCT, A PROCESS FOR ITS PREPARATION AND IT USE

Dieter H. Klein, Rheinmünster, Fed. Rep. of Germany, and Raymond Koenig, Vendenheim, France, assignors to The Dow Chemical Company, Midland, Mich.

PCT No. PCT/EP85/00027, § 371 Date Sep. 9, 1985, § 102(e) Date Sep. 9, 1985, PCT Pub. No. WO85/03513, PCT Pub. Date Aug. 15, 1985

PCT Filed Jan. 30, 1985, Ser. No. 777,980

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1984, 3403171

Int. Cl.[4] C08G *14/06, 59/14;* **C08L** *61/00*

U.S. Cl. 525—489 **17 Claims**

1. Polyfunctional phenolic reaction product of an alkylated amine-aldehyde condensation product with a polyhydric phenol or a mixture of a polyhydric phenol and a monohydric phenol, characterized in that the phenol compound(s) has been used in such an amount as to produce a ratio of phenolic OH groups to alkoxy groups of 1:1 to less than 2:1 and in that the reaction product is soluble in organic solvents.

4,698,402

CHIP RESISTANT PRIMER COMPOSITION IV

Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe Farms, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 16, 1985, Ser. No. 809,605

Int. Cl.[4] C08G *59/14;* **C08L** *63/02*

U.S. Cl. 525—533 **10 Claims**

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight (M_n) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy amine adduct precursor having a number average molecular weight (M_n) of between about 1,000 and about 4,000, said precursor being the reaction product of diepoxide with aliphatic diol in chain extension reaction and hydroxy functional secondary amine in chain termination reaction in approximately a 1 to 1 equivalent ratio with the chain extended reaction product, wherein said polymerization of said lactone monomers is carried out at a temperature between about 50° C. and about 300° C. and the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers.

4,698,403

NICKEL-CATALYZED COPOLYMERIZATION OF ETHYLENE

Ulrich Klabunde, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 15, 1985, Ser. No. 787,148

Int. Cl.[4] C08F *4/06, 4/80;* **B01J** *31/00*

U.S. Cl. 526—126 **7 Claims**

1. Copolymerization process comprising contacting and reacting ethylene, in an oxygen-free atmosphere, at a temperature in the range of about 0° C. to about 200° C., in the presence of a selected nickel-containing catalyst, with one or more 1-olefins of the formula $CH_2{=}CHX$ wherein:

X is —R, —OR, $-R_HR_F$, $-OR_F$, $-Si(OR^1)_{3-x}(R^1)_x$, $-OSi(OR^1)_{3-x}(R^1)_x$, $-N(R')(R^2)$—$Sn(R^1)_3$ and $-B(R^1)_2$;

R is hydrocarbyl, provided, however: (i) conjugated aliphatic unsaturation and terminal —C≡CH groups are excluded, and any unsaturation is separated from the enyl group $CH_2{=}CH$— by at least one carbon atom; and (ii) any functional substituent selected from —OH, $-CO_2R^2$, $-CO_2Si(OR^1)_{3-x}(R^1)_x$, $-C(O)N(R^1)_2$, $-N(CH_3)_2$, $-SOR^2$, $-SO_2R^2$ or $-OSO_2R^2$ is separated from the enyl group $CH_2{=}CH$ by at least two carbon atoms;

R_H is $C_{1\text{-}20}$ hydrocarbylene;

R_F is $C_{1\text{-}20}$ perfluorocarbyl, optionally containing in-chain ether oxygen;

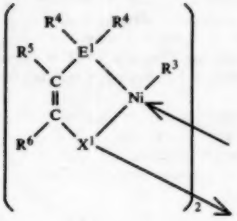
R′ is $C_{2\text{-}10}$ hydrocarbyl;

x is 0 or an integer of 1 to 3; each R^1, independently, is H or $C_{1\text{-}20}$ hydrocarbyl; and

R^2 is $C_{1\text{-}20}$ hydrocarbyl,

the nickel-containing catalyst selected from:

1(a) The dinickel compound of the formula



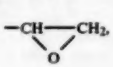
wherein:

R^3 and each R^4, independently, is H or $C_{1\text{-}20}$ hydrocarbyl;

X^1 is O or S;

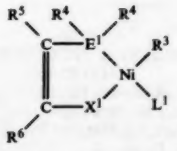
E^1 is P, As or Sb; and

each of R^5 and R^6, independently, is H, $C_{1\text{-}20}$ hydrocarbyl or a functional group selected from —13 OR^2, —Cl, $-CO_2R^2$, $-CO_2M$, $-C(O)N(R^1)_2$, $-C(O)R^2$, $-SR^2$, $-SO_2R^2$, $-OSO_2R^2$, $-SOR^2$, $-P(O)(OR^2)_{2-y}(R^1)_y$, —CN, $-NHR^2$, $-N(R^2)_2$,

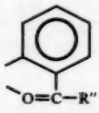


—$SI(OR^1)_{3-x}(R^1)_x$, —$OSi(OR^1)_{3-x}(R^1)_x$, —NO_2, —SO_3M, —PO_3M_2 and —$P(O)(OR^2)_2M$ wherein M is alkali or alkaline earth metal, ammonium, quaternary ammonium, phosphonium or arsonium, y is 0, 1 or 2 and R^1, each R^2, independently, and x are as defined above, or R^5 and R^6, taken together, is a substituted or unsubstituted C_{5-8} alicyclic, C_{5-8} heterocyclic or C_{6-14} aromatic ring, the heteroatom of the heterocyclic ring being selected from O, N and S;

1(b) the nickel compound of the formula

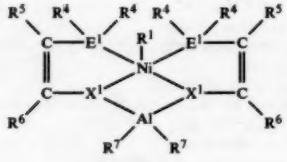


wherein: R^3, R^4, R^5, R^6, X^1 and E^1 are defined as above and L^1 is a weakly coordinating ligand, or R^3 and L^1 taken together is



wherein R'' is H, C_{1-20} hydrocarbyl or oxyhydrocarbyl or $N(R^2)_2$ wherein R^2 is defined as above:

1(c) the nickel-containing compound of the formula



wherein:

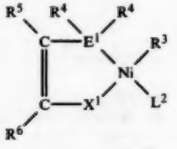
R^1, R^4, R^5, R^6, X^1 and E^1 are defined as above; and

each R^7, independently, is H, —$OSi(R''')_3$, C_{1-20} alkyl or oxyalkyl, C_{6-20} aryl, alkaryl, aralkyl or oxyaryl, $N(R^2)_2$ wherein R^2 is as defined above, or halogen, or both R^7 groups, taken together, is a 5 to 8-membered heterocyclic ring wherein the heteroatom is selected from O, N and S; and

each R''', independently, is C_{1-20} alkyl or oxyalkyl, C_{6-20}, alkaryl, aralkyl or oxyaryl;

(2) the mixture comprising:

(i) the nickel compound of the formula

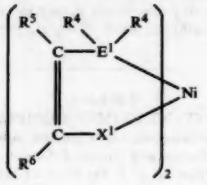


wherein: R^3, R^4, R^5, R^6, X^1 and E^1 are defined as above and L^2 is a strongly coordinating ligand; and

(ii) an acceptor compound which can react irreversibly with L^2;

(3) the mixture comprising:

(i) the nickel compound of the formula



wherein: R^4, R^5, R^6, X^1 and E^1 are defined as above; and

(ii) a suitable alkylating or arylating compound; and

(4) the mixture and comprising:

(i) one or more zero-valent olefin-nickel compounds or π-allyl nickel compounds, or a nickel(I) or nickel(II) compound capable of forming said compounds in the presence of a reducing agent; and

(ii) the phosphorane of the formula $(R^4)_3P{=}C(R^5)C(O)R^6$ wherein: R^4, R^5 and R^6 defined as above, with the proviso that at least one R^4 is aryl or substituted aryl.

4,698,404

WATER-ABSORBENT ACRYLIC ACID POLYMER GELS

Jeffrey R. Cramm, Winfield, and Kristy M. Bailey, Naperville, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Mar. 16, 1987, Ser. No. 26,073

Int. Cl.[4] C08F *2/00*

U.S. Cl. 526—204 **3 Claims**

1. An improved process for producing an alkali metal acrylate or ammonium acrylate polymer having excellent salt solution absorbency, characterized by suspending an aqueous solution of acrylic acid and an alkali metal acrylate or ammonium acrylate, the mole ratio of the acrylic acid to the alkali metal acrylate or ammonium acrylate being 50/50 to 2/98, in an alicyclic or aliphatic hydrocarbon solvent containing a surfactant having an HLB value of 8–12, subjecting the resulting suspension to inverse suspension polymerization in the presence of a water-soluble radical polymerization initiator and, if necessary, crosslinking the resulting polymer with a crosslinking agent, the improvement which comprises conducting the polymerization in the presence of a water-soluble chain transfer agent.

4,698,405

RESINOUS COPOLYMER COMPOSITION BASED ON HYDROCARBONS AND THEIR USE IN ADHESIVES

Yves Runavot, 204, Boulevard de Creteil, F 94100 Saint Maur des Fosses; André Thiot, 89bis, Rue de Chailloit, F 95100 Argenteuil, and Jacques Salvetat, 27, Avenue Corot, F 78110 Le Vesinet, all of France

Filed Mar. 3, 1986, Ser. No. 835,789

Claims priority, application Netherlands, Jul. 26, 1985, 8502135

Int. Cl.[4] C08F *12/06*

U.S. Cl. 526—347 **11 Claims**

1. A resinous copolymer adhesive composition essentially composed of a vinyl-aromatic monomer and at least one other hydrocarbon having a copolymerizable unsaturation, optionally together with one or more further copolymerizable compounds selected from the group consisting of substituted benzene compounds, unsaturated carboxylic acid compounds and conjugated dienic compounds, wherein said copolymer composition comprises at least 5% by weight of paramethylstyrene units, in a proportion at least equal to the amount of metamethylstyrene, if any, present in said copolymer composition, said resinous composition having a molecular weight of from 400 to 2,000.

4,698,406

CURABLE ORGANOPOLYSILOXANE COMPOSITION

Peter Y. K. Lo, and Maris J. Ziemelis, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Nov. 4, 1986, Ser. No. 926,762
Int. Cl.[4] C08G 77/06
U.S. Cl. 528—12 48 Claims

1. A curable composition comprising:

(i) an amine-functional organopolysiloxane consisting of a plurality of independently selected units of the formula

$$R_aSiO_{(4-a-b)/2}$$
$$|$$
$$X_b$$

wherein X is an amine-functional organic group bearing at least one —NHR″ group, in which R″ is hydrogen or an alkyl radical having 1–6 carbon atoms, R is a group selected from alkyl, cycloalkyl, haloalkyl, aromatic or haloaromatic radicals, a has a value of 0, 1, 2, or 3, b has a value of 0, 1 or 2, and the sum (a+b) is less than 4, there being on average at least two X groups per molecule of said amine-functional organopolysiloxane; and

(ii) an acryl-functional organopolysiloxane consisting of a plurality of independently selected units of the formula

$$R_cSiO_{(4-c-d)/2}$$
$$|$$
$$Z_d$$

wherein Z is an acryl-functional organic group bearing at least one group selected from acryloxy, methacryloxy or acrylamide radicals, R has been previously defined, c has a value of 0, 1, 2, or 3, d has a value of 0, 1 or 2, and the sum (c+d) is less than 4, there being on average at least two Z groups per molecule of said acryl-functional organo-polysiloxane, and at least one of (i) and (ii) has an average of more than two of said X groups and said Z groups, respectively, per molecule.

4,698,407

ONE-PACK CURING TYPE COMPOSITION

Masashi Nakagima, Chiba; Hiroshi Kojima, Ichihara; Tatsuro Matsui, Funabashi, and Noriaki Dokoshi, Ichihara, all of Japan, assignors to Toray Thiokol Company Limited, Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 872,223
Claims priority, application Japan, Jun. 11, 1985, 60-126927
Int. Cl.[4] C08G 77/06
U.S. Cl. 528—14 18 Claims

1. A one-pack curable composition which comprises a polymer having a molecular weight of 500 to 15,000 and having in the molecular at least two structures, each represented by the following general formula:

$$-S-\underset{\displaystyle R^3}{\overset{\displaystyle R^1}{\underset{|}{\overset{|}{Si}}}}-R^2 \qquad (I)$$

wherein R^1, R^2 and R^3 independently represent a group selected from an alkyl group having 1 to 6 carbon atoms, a phenyl group or a chloromethyl group, and an oxidizing agent.

4,698,408

SAG RESISTANT TWO-COMPONENT URETHANE ADHESIVES WITH IMPROVED THERMAL STABILITY

Anil B. Goel, Worthington, and Harvey J. Richards, Columbus, both of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Jul. 21, 1986, Ser. No. 887,482
Int. Cl.[4] C08G 18/00
U.S. Cl. 528—48 13 Claims

1. An adhesive comprising a mixture of

(A) A mixture of an isocyanate prepolymer and a polyepoxide which is essentially free of hydroxyl groups, and

(B) A mixture of a polyol, a urethane curing catalyst and an epoxy curing catalyst.

4,698,409

REACTION PRODUCTS OF ALKANOL AMINES WITH BICYCLIC AMIDE ACETALS AND THEIR APPLICATION IN POLYURETHANE POLYMERS

Anil B. Goel, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 740,663, Jun. 3, 1985, Pat. No. 4,600,796. This application May 2, 1986, Ser. No. 858,979
Int. Cl.[4] C08G 18/77, 18/32
U.S. Cl. 528—73 4 Claims

1. In the process for preparing a polyurethane by reaction of a polyol component and a polyisocyanate, the improvement comprising using as part of the polyol component a polyol produced by reaction of a bicyclic amide acetal and an alkanol amine at a temperature of at least 120° C.

4,698,410

PROCESS FOR THE PREPARATION OF HIGH-TEMPERATURE-RESISTANT DENSE OR CELLULAR POLYURETHANE ELASTOMERS

Wolfgang Straehle, Heidelberg; Matthias Marx, Bad Durkheim, and Uwe Schuett, Obergriesbach, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 26, 1986, Ser. No. 878,632
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526413
Int. Cl.[4] C08G 18/38
U.S. Cl. 528—76 10 Claims

1. A process for the preparation of cellular or noncellular polyurethane elastomers comprising reacting

(a) an organic polyisocyanate,

(b) a high molecular weight compound having at least two reactive hydrogen atoms, and

(c) an amino and/or hydroxyl group substituted diurea and/or polyurea having a molecular weight of from 200 to 400 ; and optionally

(d) a chain extender and/or cross-linking agent; in the presence of:

(e) a catalyst and, optionally in the presence of

(f) a blowing agent, and

(g) an auxiliary and/or an additive.

4,698,411

POLYESTER RESINS

H. Wayne Hill, Jr., Bartlesville, Okla., and Michael D. Cliffton, Omaha, Nebr., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 30, 1986, Ser. No. 857,271
Int. Cl.[4] C08G 63/52, 63/76
U.S. Cl. 528—303 20 Claims

1. An unsaturated polyester resin prepared from (1) dialcohol having from about 2 to about 10 carbon atoms per molecule, (2) unsaturated dicarboxylic acid or dicarboxylic acid anhydride having from about 4 to about 10 carbon atoms per moledule and (3) at least one substituted succinic acid or substituted succinic anhydride selected from the group consisting of alkyl-, alkenyl- and alkaryl-substituted succinic acids and their

anhydrides, having from about 7 to about 10 carbon atoms per molecule.

7. A process for preparing an unsaturated polyester resin comprising contacting under polycondensation conditions (1) at least one compound selected from the group consisting of (a) alkyl-, aleknyl- and alkaryl-substituted succinic acids having from about 7 to about 10 carbon atoms per molecule and (b) alkyl-, alkenyl- and alkaryl-substituted anhydrides having from about 7 to about 10 carbon atoms per molecule with (2) at least one unsaturated dicarboxylic acid or corresponding anhydrides having from about 3 to about 10 carbon atoms per molecule and (3) at least one dialcohol having from about 2 to about 10 carbon atoms per molecule.

4,698,412

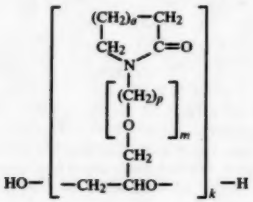
LACTAM COPOLYMERS

David J. Tracy, Lincoln Park; Robert B. Login, Oakland, and Mohamed M. Hashem, Wayne, all of N.J., assignors to GAF Corporation, Wayne, N.J.

Filed Mar. 2, 1987, Ser. No. 20,841
Int. Cl.[4] C08G *69/20*
U.S. Cl. 528—323 **10 Claims**

1. A hydroxy terminated lactam/alkyleneoxide copolymer consisting essentially of:

(a) from 2 to 200 units of a lactam monomer having the structure



wherein a has a value of 1–3, p has a value of 1–2 and m has a value of 0–1;

(b) from 2 to 100 units of propylene oxide and

(c) from 0 to 50 units of ethylene oxide said polymer containing a major amount of the propylene oxide units with respect to ethylene oxide units.

4,698,413

ACRYLIC FIBER SUITABLE FOR PREPARING CARBON OR GRAPHITE FIBERS

Charles E. Lynch, Camden, S.C., and William K. Wilkinson, Waynesboro, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 593,172, Mar. 26, 1984, abandoned, which is a continuation of Ser. No. 347,729, Feb. 10, 1982, abandoned, which is a continuation of Ser. No. 230,030, Jan. 30, 1981, Pat. No. 4,336,022, which is a continuation-in-part of Ser. No. 62,908, Aug. 1, 1979, abandoned. This application Oct. 31, 1985, Ser. No. 793,720
Int. Cl.[4] C08F *28/00*
U.S. Cl. 525—328.5 **3 Claims**

1. An acrylic fiber capable of being oxidized in one or more stages at a temperature of at least 10° C. below the stick temperature of fibers entering that stage to a density of at least 1.36 g/cm^3 in 4–20 minutes consisting essentially of 93–99.4% mol percent acrylonitrile units, 0.6–4.0 mol percent ammonium or amine salts having an intermediate amine having a pK_b of 5 or less, as neutralizing cations for sulfuric or sulfonic acid end groups derived from the initiator and activator, if present, and as neutralizing cations for sulfonic acid groups incorporated into the polymer by copolymerization of one or more copolymerizable, sulfonic acid containing comonomers selected from the group consisting of styrene sulfonic acid, allyl sulfonic acid, methallyl sulfonic acid, 2-acrylamido-2 methylpropane sulfonic acid and ethylene sulfonic acid and substantially the remaining mol percent comprised of non-ionic vinyl comonomers and containing less than 100 parts per million of metallic cations.

4,698,414

COPOLY(P-PHENYLENE TEREPHTHALAMIDE/2,6-NAPHTHALAMIDE)ARAMID YARN

Thomas I. Bair, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 16, 1986, Ser. No. 909,100
Int. Cl.[4] C08G *69/32*
U.S. Cl. 528—339 **7 Claims**

1. A yarn of aromatic polyamide consisting essentially of copoly(p-phenylene terephthalamide/2,6-naphthalamide) wherein the mole fraction of 2,6-naphthalamide is from 0.005 to 0.10.

4,698,415

METHOD FOR THE PREPARATION OF POLYARYLENE SULFIDE WITH AQUEOUS POLYETHYLENE GLYCOL MIXTURE

Richard G. Sinclair; Herman P. Benecke, and Sylvester Sowell, all of Columbus, Ohio, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 682,798, Dec. 18, 1984, abandoned. This application May 6, 1986, Ser. No. 861,622
Int. Cl.[4] C08G *75/14*
U.S. Cl. 528—388 **18 Claims**

1. A method for the preparation of a polyarylene sulfide comprising reacting an alkali metal sulfide with a polyhalogenated aromatic compound in a heterogeneous reaction mixture comprising water and polyethyleneglycol having a number average molecular weight of from 2,000 to 20,000 the weight ratio of the water to said polyethyleneglycol being from 25:1 to 1:10, to form said polyarylene sulfide and to form an alkali metal halide salt and recovering said polyarylene sulfide from said reaction mixture.

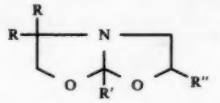
4,698,416

REACTION OF BICYCLIC AMIDE ACETAL WITH SULFUR

Anil B. Goel, Worthington, and Harvey J. Richards, Columbus, both of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Jun. 23, 1986, Ser. No. 877,059
Int. Cl.[4] C08G *75/00*
U.S. Cl. 528—389 **9 Claims**

1. The process for preparing a polymer comprising reacting a bicyclic amide acetal having the formula



wherein R, R′ and R″ independently represent hydrogen, an alkyl group or an alkyl ether group having from 1 to 20 carbon atoms or an alkaryl group having from 7 to 20 carbon atoms, and R and R″ also independently represent an aryl or an aryl ether group having from 6 to 20 carbon atoms, with sulfur at a temperature in the range of from about 25° C. to about 200° C.

4,698,417

PRODUCTION OF OXY-METALLO-ORGANIC POLYMER

Peter E. D. Morgan, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 24, 1986, Ser. No. 831,955
Int. Cl.[4] C08G 79/08, 79/10, 79/00
U.S. Cl. 528—395 15 Claims

1. A process for producing an oxy-metallo-alkoxy polymer which comprises:

heating an n or s alkoxy-metallo-organic compound of an element selected from the group consisting of Al, Ti, Zr, Mg, Be, Y, Si, B, and a rare earth element, and mixtures thereof, substantially at reflux temperature, in the absence of an solvent, thereby polymerizing said n or s alkoxy metallo-organic compound, and

recovering an oxy-metallo-alkoxy polymer.

4,698,418

PROCESS FOR PREPARING ANTIBIOTIC L 17046

Adriano Malabarba, and Bruno Cavalleri, both of Milan, Italy, assignors to Gruppo Lepetit, S.p.A., Gerenzano, Italy

Filed Sep. 20, 1985, Ser. No. 778,473
Int. Cl.[4] C07K 5/12
U.S. Cl. 530—317 7 Claims

1. A process for converting a teicoplanin compound into antibiotic L 17046 characterized in that a teicoplanin compound selected from teicoplanin complex, any further purified preparation thereof, teicoplanin factor A_2, teicoplanin factor A_3, each of the main components of teicoplanin factor A_2, antibiotic L 17054 or a mixture of two or more of the above substances in any proportion is submitted to hydrolysis with a strong acid in the presence of a polar aprotic organic solvent selected from ethers, ketones, and mixtures thereof, which are liquid at room temperature.

4,698,419

HEXAPEPTIDE

Evgeny I. Chazov; Vladimir N. Smirnov; Valentin A. Vinogradov; Vladimir M. Polonsky; Valentina A. Tischenko; Mikhail I. Titov; Zhanna D. Bespalova, and Boris L. Pekelis, all of Moscow, U.S.S.R., assignors to Vsesojuzny Kardiologichesky Nauchny Tsentr Akademii Meditsinskikh Nauk SSSR, Moscow, U.S.S.R.

PCT No. PCT/SU85/00031, § 371 Date Feb. 5, 1986, § 102(e) Date Feb. 5, 1986, PCT Pub. No. WO86/00621, PCT Pub. Date Jan. 30, 1986
PCT Filed Apr. 24, 1985, Ser. No. 835,114
Claims priority, application U.S.S.R., Jul. 16, 1984, 3772913
Int. Cl.[4] C07K 7/06
U.S. Cl. 530—329 1 Claim

1. A hexapeptide of the following structure:

Phe-Ala-Gly-Phe-Gly-Arg.

4,698,420

ANTIBODY HYBRID MOLECULES AND PROCESS FOR THEIR PREPARATION

Howard B. Urnovitz, San Francisco, Calif., assignor to Xoma Corporation, Berkeley, Calif.

Filed Feb. 25, 1985, Ser. No. 705,271
Int. Cl.[4] C07K 3/08
U.S. Cl. 530—387 16 Claims

1. A method for preparing an antibody hybrid molecule by forming a covalent disulfide bond between a sulfhydryl group on an organic moiety and a intermolecular sulfhydryl group found on the carboxyl terminal cysteine residue of the heavy chain of the monomeric form of an antibody of class IgA of IgM, said method comprising the steps of:

(1) selecting an polymeric antibody of interest, said antibody selected from the group consisting of class IgA or IgM antibodies;

(2) activating a sulfhydryl group found on the carboxyl terminal cysteine residue of the heavy chain of the monomeric form of said anitbody by mild reduction, wherein the mild reduction breaks a intermolecular polymer-forming disulfide bond without breaking intramolecular bonds; and

(3) conjugating said antibody monomer to a moiety of interest by way of a disulfide bond consisting essentially of a bond formed between said activated sulfhydryl group and a free sulfhydryl group on said moiety.

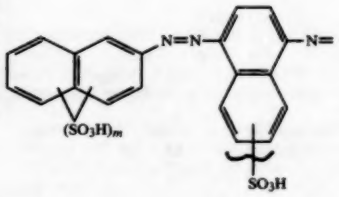
4,698,421

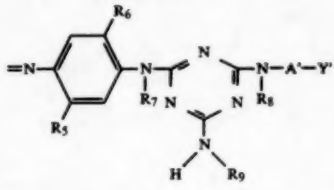
FIBER-REACTIVE DISAZO BROWN DYE HAVING VINYLSULFONE-TYPE REACTIVE GROUP

Yutaka Kayane, Ibaraki; Hirokazu Sawamoto, Minoo; Takashi Omura, Ashiya, and Naoki Harada, Suita, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 7, 1985, Ser. No. 742,309
Claims priority, application Japan, Jun. 14, 1984, 59-122335
Int. Cl.[4] C09B 62/453, 62/533; D06P 1/384, 3/66
U.S. Cl. 534—642 5 Claims

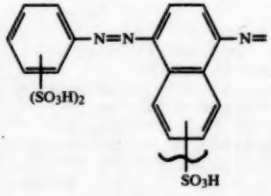
1. A compound, or a salt thereof, represented by the following formula,





wherein R_5 is methyl, methoxy, acetylamino or ureido, R_6 is hydrogen, methyl, ethyl or methoxy, R_7 and R_8 are independently hydrogen, methyl or ethyl, R_9 is hydrogen, ethyl, phenyl unsubstituted or substituted with one or two sulfo groups or naphthyl unsubstituted or substituted with one or two sulfo groups, A' is phenylene unsubstituted or substituted with at least one of methyl and methoxy, or naphthylene which is unsubstituted or substituted with sulfo, and Y' is β-sulfatoethylsulfonyl or vinylsulfonyl, and m is 2 or 3.

2. A compound, or a salt thereof, represented by the following formula,



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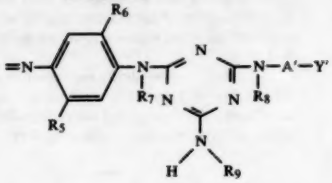


wherein R_5 is methyl, methoxy, acetylamino or ureido, R_6 is hydrogen, methyl, ethyl or methoxy, R_7 and R_8 are independently hydrogen, methyl or ethyl, R_9 is hydrogen, ethyl, phenyl unsubstituted or substituted with one or two sulfo groups or naphthyl unsubstituted or substituted with one or two sulfo groups, A' is phenylene unsubstituted or substituted with at least one of methyl and methoxy, or naphthylene which is unsubstituted or substituted with sulfo, and Y' is β-sulfatoethylsulfonyl or vinylsulfonyl.

4,698,422

TRIPHOS AND TETRAPHOS GOLD COMPOUNDS AND LIGANDS

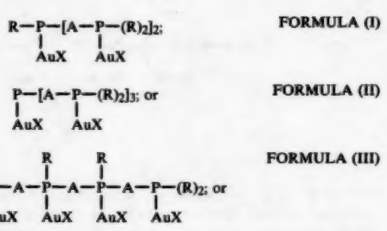
David T. Hill, North Wales, and Randall K. Johnson, Ardmore, both of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 736,003, May 20, 1985, abandoned. This application Apr. 4, 1986, Ser. No. 849,078

Int. Cl.[4] A61K *31/70;* **C07H** *5/10*

U.S. Cl. 536—17.1 **47 Claims**

1. A compound of the formula:



FORMULA (I)

FORMULA (II)

FORMULA (III)

wherein:

R is phenyl;

A is a straight or branched alkanediyl chain of from one to six carbon atoms; and

X is halo or thiosugar.

4,698,423

ELLIPTICINE DERIVATIVE AND PRODUCTION PROCESS THEREOF

Tadashi Honda, and Toshihiro Nakanishi, both of Ibaraki, Japan, assignors to Suntory Limited, Osaka, Japan

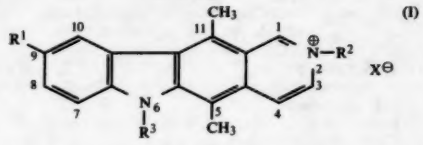
Filed Jul. 25, 1985, Ser. No. 758,879

Claims priority, application Japan, Jul. 31, 1984, 59-161296

Int. Cl.[4] C07D *471/02;* **A61K** *31/475*

U.S. Cl. 536—24 **20 Claims**

1. A ellipticine derivative having the formula:



(I)

wherein

R^1 represents a hydrogen atom, a hydroxyl group, an alkoxyl group having 1 to 4 carbon atoms, or an acyloxy group having 2 to 7 carbon atoms;

R^2 represents an aldose residue, a deoxyaldose residue, an N-acylaminoaldose residue having a substituted acyl group with 2 to 4 carbon atoms bonded to the N atom, an aldohexuronic amide residue, an aldohexuronic acid residue, an acylated aldose residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 2 to 4 carbon atoms or an arylacyl group with 7 to 9 carbon atoms, an acylated deoxyaldose residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 2 to 4 carbon atoms or an arylacyl group with 7 to 9 carbon atoms, an acylated N-acylaminoaldose residue having an amino group substituted with an acyl group with 2 to 4 carbon atoms and having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 2 to 4 carbon atoms or an arylacyl group with 7 to 9 carbon atoms, an acylated aldohexuronic amide residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 2 to 4 carbon atoms or an arylacyl group with 7 to 9 carbon atoms, an acylated aldohexuronic acid residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 2 to 4 carbon atoms or an arylacyl group with 7 to 9 carbon atoms, an acylated aldohexuronic acid ester residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 2 to 4 carbon atoms or an arylacyl group with 7 to 9 carbon atoms, an arylalkylated aldose residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an arylalkyl group with 7 to 8 carbon atoms, an arylalkylated deoxyaldose residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an alkylacyl group with 7 to 8 carbon atoms, an arylalkylated N-acylaminoaldose residue having an amino group with an acyl group with 2 to 4 carbon atoms and having, substituted for the hydrogen of the hydroxyl group of the sugar, an arylalkyl group with 7 to 8 carbon atoms, an arylalkylated aldohexuronic amide residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an arylalkyl group with 7 to 8 carbon atoms, an arylalkylated aldohexuronic acid residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an arylalkyl group with 7 to 8 carbon atoms, or an arylalkylated aldohexuronic acid ester residue having, substituted for the hydrogen atom of the hydroxyl group of the sugar, an arylalkyl group with 7 to 8 carbon atoms; and

R^3 represents a hydrogen atom, a linear, branched, cyclic, or cyclic-linear alkyl group having 1 to 5 carbon atoms;

$X^{\ominus}$ represents a pharmaceutically acceptable inorganic or organic acid anion; and

the bond represented by $N^{\oplus}—R^2$ in the formula (I) represents a glycoside bond between a nitrogen atom in the 2-position of the ellipticine and a carbon atom in the 1-position of the sugar.

4,698,424

ISOCYANATO-ISOCYANURATE DERIVATIVES

Theodor Engbert, Dormagen; Hartmut Knöfel, Odenthal-Erberich, both of Fed. Rep. of Germany, and Gerhard Wegener, New Martinsville, W. Va., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

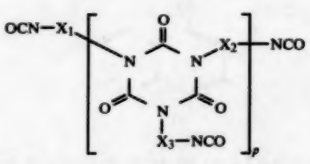
Filed Oct. 31, 1984, Ser. No. 666,586

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1983, 3339579

Int. Cl.⁴ C07D *251/34*

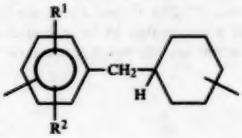
U.S. Cl. 544—222 **3 Claims**

1. Isocyanato-isocyanurates corresponding to the formula



(I)

in which X_1, X_2 and X_3 may be the same or different and represent radicals corresponding to the formula



(II)

wherein R^1 represents hydrogen, R^2 represents a C_1-C_3 alkyl group and p is a whole or (on a statistical average) fractional number of from 1 to 5.

4,698,425

1,3 DISUBSTITUTED AROMATIC CYCLOHEXANE IMIDES

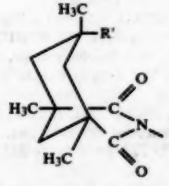
Julius Rebek, Pittsburgh, Pa., assignor to Year Laboratories, Inc., Los Angeles, Calif.

Filed Jul. 24, 1984, Ser. No. 634,053

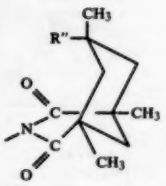
Int. Cl.⁴ C07D *401/14*

U.S. Cl. 544—235 **41 Claims**

1. A compound comprising a first group having the structure,



and a second group having the structure,



bonded by the imide nitrogens in a 1,3 relationship to a fused or monocyclic, substituted or unsubstituted, five or six membered aromatic compound, wherein a portion of the ring structure is,

and wherein said imide nitrogens are bonded to C_1' and C_3' respectively, X_2' is either N or CH and R' and R" are either the same or different and each is a moiety selected from the group consisting of carboxyl, nitrile, hydroxyaminocarbonyl, thiocarboxy, dithiocarboxy, aminoiminomethyl and amino carbonyl.

4,698,426

CYCLIC AMIDINES USEFUL AS CATALYSTS IN THE HARDENING OF EPOXIDE RESINS

Rolf-Volker Meyer; Hans-Joachim Kreuder, and Erwin Hohl, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 475,710, Mar. 16, 1983, Pat. No. 4,510,288. This application Feb. 7, 1985, Ser. No. 699,198

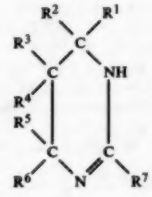
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1982, 3211301

The portion of the term of this patent subsequent to Apr. 9, 2002, has been disclaimed.

Int. Cl.⁴ C07D *239/02*; C08L *59/58*

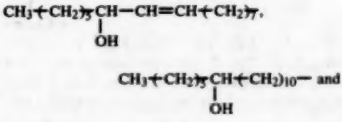
U.S. Cl. 544—253 **3 Claims**

1. Compounds corresponding to the formula



in which

R^1 to R^6 independently of one another represent a hydrogen atom, a C_1-C_4-alkyl, C_5-C_{10}-cycloalkyl, C_7-C_{13}-aralkyl or a C_6-C_{18}-aryl group or two substituents R^1/R^2, R^3/R^4, R^5/R^6, R^1/R^3 or R^1/R^5 together represent a C_1-C_5-alkenylene group, R^7 representa a member of the group consisting of



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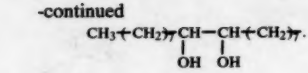


4,698,427

CATALYTIC METHOD FOR THE CONJOINT MANUFACTURE OF N-AMINOETHYLPIPERAZINE AND TETRAETHYLENEPENTAMINE

Steven H. Vanderpool, New Braunfels, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jun. 9, 1986, Ser. No. 871,953

Int. Cl.[4] C07D *241/04*; C07C *85/06*

U.S. Cl. 544—404 **6 Claims**

1. A method for the conjoint manufacture of N-aminoethylpiperazine and tetraethylenepentamine which comprises bringing a solution of diethanolamine and/or hydroxyethyldiethylenetriamine in ethylenediamine containing about 10 to about 50 wt. % of diethanolamine and/or hydroxyethyldiethylenetriamine with a cyclization catalyst at a temperature of about 250°–400° C. for a period of time sufficient to convert at least a portion of said feed component to N-aminoethylpiperazine and tetraethylenepentamine,

said catalyst composition comprising titania having from about 0.5 to about 7 wt. % of phosphorus thermally chemically bonded to the surface thereof in the form of phosphate bonds.

4,698,428

CATALYTIC METHOD FOR THE MANUFACTURE OF N,N'-DIMETHYLPIPERAZINE

Robert L. Zimmerman, Austin, and Steven H. Vanderpool, New Braunfels, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jun. 9, 1986, Ser. No. 871,954

Int. Cl.[4] C07D *241/04*; C07C *85/06*

U.S. Cl. 544—404 **3 Claims**

1. A method for the manufacture of N,N'-dimethylpiperazine which comprises bringing a feedstock comprising N-methyldiethanolamine into contact with a cyclization catalyst at a temperature of about 260°–350° C. and a pressure within the range of about 500 to about 2000 psig. for a period of time sufficient to convert at least a portion of said N-methylethanolamine to N,N'-dimethylpiperazine, said catalyst composition consisting essentially of titania having from about 0.5 to about 7 wt. % of phosphorus thermally chemically bonded to the surface thereof in the form of phosphate bonds.

4,698,429

ALKYLATED 8-HYDROXYQUINOLINE DERIVATIVES VIA A DIELS-ALDER CYCLOADDITION TO 5,7-DIALLYL OR 7-ALLYL SUBSTITUENTS THEREON

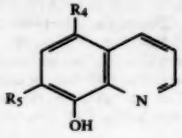
Kent S. Kokko, Shoreview, and Phillip L. Mattison, New Brighton, both of Minn., assignors to Henkel Corporation, Ambler, Pa.

Filed Dec. 3, 1985, Ser. No. 804,403

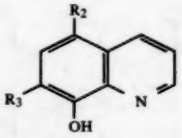
Int. Cl.[4] C07D *215/26*

U.S. Cl. 546—179 **8 Claims**

1. A compound produced from the Diels-Alder reaction at temperatures of about 15°–250° C. and a pressure of about 1–5 atmospheres of (a) a conjugated hydrocarbon having from 4–20 carbon atoms and (b) an 8-hydroxyquinoline of the formula:

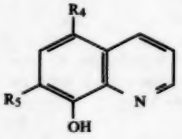


wherein R_4 is hydrogen and R_5 is allyl to provide a compound of the formula

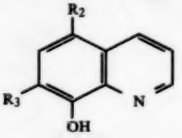


where R_2 is selected from the group consisting of hydrogen and R_3 and wherein R_3 is the residual hydrocarbon radical remaining from the reaction of said conjugated diene and said R_5.

4. A compound produced from the Diels-Alder reaction at temperatures of about 15°–250° C. and a pressure of about 1–5 atmospheres of (a) a conjugated hydrocarbon diene having from 4–20 carbon atoms and (b) an 8-hydroxyquinoline of the formula:



wherein both R_4 and R_5 are allyl groups to provide a compound of the formula



wherein each of R_2 and R_3 residual hydrocarbon radical remaining from the reaction of said conjugated diene and said allyl groups R_4 and R_5.

4,698,430

NITRO, AMINO AND AROYLAMINO-N-PHENYLPYRIDINAMINES

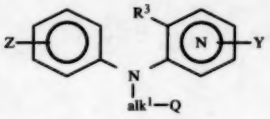
Chandler R. Taylor, Jr., Mechanicsville, and Young S. Lo, Richmond, both of Va., assignors to A. H. Robins Company, Inc., Richmond, Va.

Division of Ser. No. 394,551, Jul. 2, 1982, Pat. No. 4,558,132. This application Aug. 30, 1985, Ser. No. 770,936

Int. Cl.[4] C07D *213/44, 401/00, 211/68, 405/00*

U.S. Cl. 546—262 **2 Claims**

1. A compound selected from the group having the formula:



wherein;

Q is selected from the group consisting of hydrogen, N—R^1R^2 or halogen;

R^1 and R^2 taken together with the adjacent nitrogen atom form a heterocyclic residue selected from 1-phthalimido, 1-pyrrolidinyl, 1-piperidinyl or 1-piperazinyl substituted in the 4-position by loweralkyl, alkoxy carbonyl or any blocking group which may subsequently be removed to give the unsubstituted piperazine radical;

R^3 is selected from the group consisting of 2 or 3-thienyl, 2, 3 or 4-pyridinyl, phenyl or phenyl substituted by 1 to 3 radicals selected from halo, loweralkyl, loweralkoxy, trifluoromethyl, or nitro and may be the same or different;

alk^1 is a straight or branched hydrocarbon chain containing 1–8 carbon atoms;

Y is selected from the group consisting of hydrogen or 1–2 radicals selected from loweralkyl or loweralkoxy and may be the same or different;

Z is selected from the group consisting of hydrogen, halogen, loweralkyl, loweralkoxy or nitro;

and the acid addition salts thereof.

4,698,431

HYDROXYPYRIDONATE CHELATING AGENTS

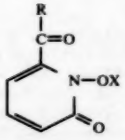
Kenneth N. Raymond, Berkeley, Calif.; Robert C. Scarrow, Minneapolis, Minn., and David L. White, Oakland, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 12, 1985, Ser. No. 796,815

Int. Cl.[4] C07D *213/90*

U.S. Cl. 546—298 **2 Claims**

1. A chelating agent having the structure:



wherein R is a hydroxy group or

where R_1 and R_2 are selected from the group consisting of H, $—CH_3$, $—CH_2CH_3$ and $—CH_2—\phi$, and X is either hydrogen, an alkali metal ion, or a quaternary ammonium ion.

4,698,432

PROCESS FOR THE RESOLUTION OF (±) 2-[2'-(P-FLUOROPHENYL)-5'-BENZOXAZOLYL]-PROPIONIC ACID

Alberto Verga, Milan; Oreste Piccolo, Leghorn, and Ermanno Valoti, Dalmine, all of Italy, assignors to Ravizza SpA, Muggio, Italy

Filed Jul. 19, 1985, Ser. No. 756,671

Claims priority, application Italy, Jul. 23, 1984, 22009 A/84

Int. Cl.[4] C07D *263/54*

U.S. Cl. 548—224 **18 Claims**

1. A process for the resolution of (±) 2-[2'-(p-fluorophenyl)-5'-benzoxazolyl]propionic acid, indicated for brevity as (±)-FBP, in order to produce (+) 2-[2'-(p-fluorophenyl)-5'-benzoxazolyl]propionic acid, indicated for brevity as (+)-FBP, characterised by comprising the following stages:

(a) salification of the (±)-FBP with (−)N-R-glucamine, indicated for brevity as NRG and in which R is C_1–C_{12} alkyl radical or a C_3–C_6 cycloalkyl radical, in the presence or absence of other bases, and in an organic solvent;

(b) fractional crystallisation, by means of which essentially the (+)-FBP/NRG salt precipitates;

(c) filtration, in order to separate the crystallised (+)-FBP/NRG salt from the mother liquors;

(d) hydrolysis of the (+)-FBP/NRG in order to obtain the required (+)-FBP;

(e) racemisation of the (−)-FBP contained in the mother liquors of stage (c), in order to obtain (±)-FBP, which is recycled to stage (a).

4,698,433

2-METHYL-4-BENZYL-5-OXAZOLIDINONE

Alan P. Croft, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 10, 1986, Ser. No. 827,854

Int. Cl.[4] C07D *263/08*

U.S. Cl. 548—228 **2 Claims**

1. A composition of matter known as 2-Methyl-4-benzyl-5-oxazolidinone.

4,698,434

PREPARATION OF HYDROXYMETHYLIMIDAZOLES

Fritz Graf, Speyer, and Leopold Hupfer, Friedelsheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 15, 1986, Ser. No. 907,585

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1985, 3534083

Int. Cl.[4] C07D *233/64*

U.S. Cl. 548—342 **6 Claims**

1. A process for the preparation of an imidazole which contains a hydroxymethyl radical on a carbon atom of the imidazole ring, wherein a 1-hydroxymethylimidazole which is unsubstituted in one or more of the positions 2, 4 and 5 of the imidazole ring is treated with an anion exchanger.

4,698,435

PROCESS FOR PREPARING 3-PHENACYLIDENE PHTHALIDES

Naotake Takaishi, and Kimihiko Hori, both of Utsunomiya, Japan, assignors to Kao Corporation, Tokyo, Japan

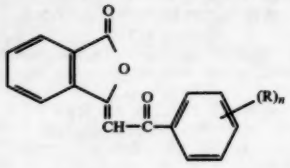
Filed Sep. 19, 1986, Ser. No. 909,297

Claims priority, application Japan, Oct. 8, 1985, 60-224095

Int. Cl.[4] C07D *307/88*

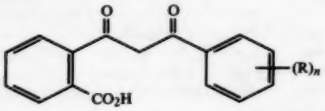
U.S. Cl. 549—305 **1 Claim**

1. A process for preparing a 3-phenacylidene phthalide of the formula (II)



(II)

in which $(R)_n$ are each a substituent capable of substitution at any position of the benzene nucleus and may be different or the same, and independently represent a hydrogen atom, a halogen atom or a linear or branched alkyl, alkenyl or alkoxy group having from 1 to 18 carbon atoms, and n is an integer of from 1 to 5, which comprises reacting a halogenating reagent with a 2-carboxydibenzoylmethane of the formula (I)



(I)

in which R and n have, respectively, the same meanings as defined above.

4,698,436

PROCESSES FOR THE PREPARATION OF SPECTINOMYCIN ANALOGS, NOVEL PRODUCTS AND INTERMEDIATES THEREIN

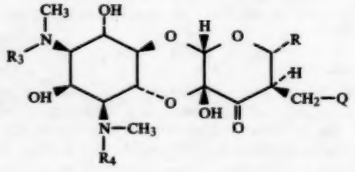
David R. White, Kalamazoo, Mich., and Clarence J. Maring, New Haven, Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,113, May 24, 1982, Pat. No. 4,467,103. This application Mar. 12, 1984, Ser. No. 588,177

Int. Cl.[4] C07D *323/04*

U.S. Cl. 549—361 **8 Claims**

1. A process for preparing a compound having the formula:



IV

wherein

R_3 and R_4 are the same and are hydrogen or a blocking group;

R is hydrogen, alkyl up to C_{20}, inclusive straight, cyclic or branch chain system, lower alkenyl, lower alkynyl, lower haloalkyl, lower aminoalkyl or $-(CH_2)_n-OX$;

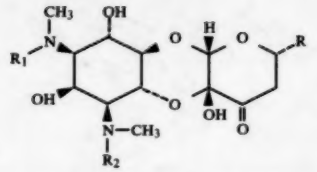
wherein

X is hydrogen, lower alkyl, lower alkenyl, benzyl or acyl and

n is an integer of from zero to four with the proviso that when n is zero then —OX cannot be hydroxy;

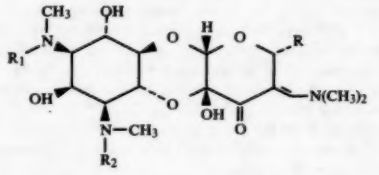
Q is a nucleophile

which comprises:



III'

wherein R_1 and R_2 are blocking groups; R is as defined above, with an acetal comprising N,N-dimethylformamide-di-tertiary-butyl acetal or N,N-dimethylformamide-dimethylacetal and trifluoroacetic acid in dimethylformamide to prepare an enamine having the formula:



II

wherein R_1, R_2, and R are all as defined above, then

(2) contacting the enamine II of step 1 with sodium cyanoborohydride in methanol having the pH maintained at 4 by addition of methanolic hydrogen chloride,

(3) adding a nucleophile and triethylamine to the mixture resulting from step 2 and a step selected from the group consisting of

(4) (a) recovering compound IV wherein R_3 and R_4 are blocking groups, or

(b) deprotecting the compound obtained from step 3 to obtain the compound of formula IV wherein R_3 and R_4 are hydrogen.

4,698,437

ALKALI METAL DIALKYLALUMINUM DIHYDRIDES AND SOLUTIONS THEREOF IN AROMATIC HYDROCARBONS

Rolf Schrader, Unna, and Ulrich Schroeer, Kamen-Methler, both of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Apr. 4, 1986, Ser. No. 848,265

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1985, 3514410

Int. Cl.[4] C07F *5/06*

U.S. Cl. 556—171 **6 Claims**

1. An alkali metal dialkylaluminum dihydride of the formula

$$M[Al\ R_{2-n}R'_nH_2],$$

wherein M is an alkali metal, R and R' are different linear or branched alkyl having up to 8 carbon atoms, and n has a value from 0.1 to 1.9.

4,698,438

PROCESS FOR THE PREPARATION OF METHYL CARBAMATES AND THIOIMIDATES

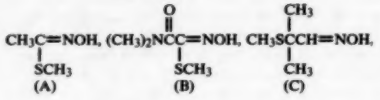
Charles T. Blaisdell, Middletown; Walter J. Cordes, Wilmington, both of Del.; George E. Heinsohn, Elkton, Md.; John F. Kook, Hockessin, and John R. Kosak, Greenville, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 727,812, Apr. 26, 1985. This application Feb. 11, 1986, Ser. No. 827,517

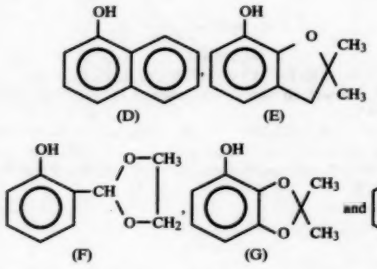
Int. Cl.[4] C07C *119/18, 131/00, 125/04;* C07D *307/78*

U.S. Cl. 558—3 45 Claims

1. In a process for forming an insecticide by reacting methyl isocyanate with an oxime or phenol selected from the group



(A) (B) (C)



(D) (E) (F) (G) (H)

the improvement comprising:

(i) employing as the source of methyl isocyanate, the reaction mixture formed from the oxidative dehydrogenation of monomethylformamide, said reaction mixture containing methyl isocyanate and water in the vapor phase,

(ii) contacting the oxime or phenol with the methyl isocyanate described in (i) in a continuous, close-coupled process employing one of steps (iii) or (iv) to prepare the methyl isocyanate for contact with the oxime or phenol,

(iii) maintaining the temperature of the methyl isocyanate/-water vapor phase mixture between about 100° C. to 650° C. until the time of contact,

(iv) enriching the mixture in methyl isocyanate relative to water by diluting with inert gas and cooling to preferentially condense water rather than methyl isocyanate.

4,698,439

MIXED ESTERS OF POLYPHOSPHAZENES

Charles H. Kolich, and W. Dirk Klobucar, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed May 12, 1986, Ser. No. 862,000

Int. Cl.[4] C07F *9/00*

U.S. Cl. 558—80 16 Claims

1. A process for making a polyphosphazene hydraulic fluid that remains solids-free on storage at temperatures down to −30° C., said process comprising:

(A) preparing a solution of about 0.2–0.3 mole parts of sodium phenoxide, 0.12–0.22 mole parts of sodium m-methylphenoxide, 0.02–0.15 mole parts of sodium p-methylphenoxide and 0.3–0.9 mole parts of sodium 2,2,2-trifluoroethoxide in an inert solvent, the total parts being about 0.85–0.95 moles for each equivalent of replaceable chlorine in the cyclic phosphonitrilic chloride oligomer,

(B) preparing a solution of about 0.2 mole parts of a cyclic phosphonitrilic chloride oligomer comprising predominantly trimer in an inert solvent,

(C) mixing the solution of step (A) with the solution of step (B),

(D) reacting the resultant mixture at a temperature in the range of ambient up to reflux until the reaction is substantially complete,

(E) preparing a solution of sodium 2,2,2-trifluoroethoxide in an inert solvent,

(F) in a second stage, mixing the trifluoroethoxide solution of step (E) with the reaction mixture of step (D), the amount of said trifluoroethoxide solution being an amount which when taken together with the sodium phenoxide, m-methylphenoxide, p-methylphenoxide and trifluoroethoxide of step (A), totals at least 1.01 mole parts per each equivalent of replaceable chlorine in said cyclic phosphonitrilic chloride oligomer,

(G) reacting the mixture at an elevated temperature up to reflux until substantially all replaceable chlorine has reacted and

(H) recovering the polyphosphazene hydraulic fluid.

4,698,440

PROCESS FOR MAKING N-BUTYL METHACRYLATE

Leslie M. Blair, Parkersburg, and Roddy M. Conrad, Charleston, both of W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 532,040, Sep. 14, 1983. This application Aug. 5, 1985, Ser. No. 762,207

Int. Cl.[4] C07C *67/08*

U.S. Cl. 560—205 1 Claim

1. A batch process for making n-butyl methacrylate which comprises reacting methacrylic acid and n-butanol in a reaction vessel equipped with a distillation column, said vessel containing a strong acid catalyst present in an amount of between 0.5 to 6 percent by weight based on total weight of reaction mixture, the initial mole ratio of n-butanol to methacrylic acid being between 1.1 to 1.5, the temperature in the reaction vessel being maintained between 95° and 120° C. and the pressure being between 30 and 150 kPa, while

a. collecting gaseous n-butanol-water azeotrope distillate from the distillation still,

b. condensing the azeotrope distillate substantially free from n-butyl methacrylate collected from step a.,

c. separating the water-rich layer from the n-butanol-rich layer of the distillate condensed in step b, and

d. returning the n-butanol-rich layer as reflux liquid to the distillation column,

said process being carried out until the methacrylic acid is substantially used up, whereupon n-butyl methacrylate is recovered from the reaction vessel.

4,698,441

PROCESS FOR PRODUCING GLYOXYLIC ACID

Tadayuki Mitani; Mamoru Endo, both of Arai, and Takashi Hiramoto, Fujimi, all of Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Nov. 5, 1982, Ser. No. 439,505

Claims priority, application Japan, Nov. 16, 1981, 56-183330

Int. Cl.[4] C07C *51/235*

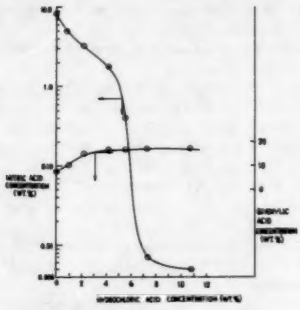
U.S. Cl. 562—531 9 Claims

1. A process for preparing an aqueous solution of glyoxylic acid containing less than 0.1 wt. % of nitric acid, which comprises:

forming an aqueous liquid reaction solution of glyoxal and containing dissolved therein from 6 to 40 wt. % of a nonoxidizing strong acid having a pKa <0 and selected from the group consisting of hydrochloric acid, hydrobromic acid, sulfuric acid and toluene sulfonic acid, which acid is completely dissociated in said solution and which acid does not oxidize said glyoxal in said solution; and

adding nitric acid to said reaction solution in incremental amounts so that the concentration of said nitric acid in said

reaction solution does not exceed 1 wt. %, whereby said nitric acid reacts with said nonoxidizing strong acid to



form, in situ in said aqueous solution, an oxidizing agent which oxidizes said glyoxal to glyoxylic acid.

4,698,442

ω-GUANIDINO-SUBSTITUTED-α-AMINO ACIDS

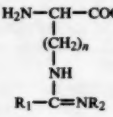
John J. Nestor, San Jose, and Brian H. Vickery, Saratoga, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation of Ser. No. 607,873, May 7, 1984, abandoned, which is a continuation-in-part of Ser. No. 451,671, Dec. 21, 1982, Pat. No. 4,481,190. This application Jun. 13, 1986, Ser. No. 874,256

Int. Cl.[4] C07C *101/04*

U.S. Cl. 562—560 **13 Claims**

1. An α-amino acid which has the formula:



(I)

or a pharmaceutically acceptable salt thereof,

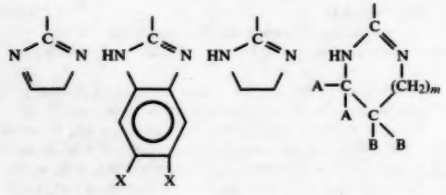
wherein

n is 1 to 5;

R_1 is alkyl of 1–12 carbon atoms, halo lower alkyl or $—NHR_3$ wherein R_3 is alkyl of 2–6 carbon atoms, cycloalkyl, phenyl, benzyl, halo lower alkyl, morpholino or $—(CH_2)_nN(R_4)_2$ wheren n is 1–5 and R_4 is lower alkyl;

R_2 is hydrogen, alkyl of 1–6 carbon atoms, cycloalkyl, phenyl, benzyl, halo lower alkyl, morpholino or $—(CH_2)_nN(R_4)_2$ wherein n is 1–5 and R_4 is lower alkyl, but is not hydrogen when R_1 is NHR_3; or

R_1 and R_2 comprises a ring represented by one of the following structural formulas:



wherein

m is 0–6;

A and B are independently hydrogen, alkyl of 1–6 carbon atoms or cycloalkyl; and

X is halo or A.

4,698,443

BIURET PURIFICATION

Donald C. Young, Fullerton, and James A. Green, II, Chino, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Jul. 10, 1985, Ser. No. 753,693

Int. Cl.[4] C07C *127/24, 126/08*

U.S. Cl. 564—38 **26 Claims**

1. A method for recovering purified biuret from a mixture which comprises biuret and higher molecular weight urea condensation products which method comprises (a) contacting a solution or melt of said mixture with a polar adsorbent under conditions sufficient to retain at least a portion of said biuret on said adsorbent and (b) contacting the resulting biuret-containing adsorbent with a polar desorbent in which said biuret is soluble under conditions sufficient to form a biuret-containing extract.

4,698,444

1,1-BIS(P-FLUOROPHENYL)UREA

Stephen S. Massett, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 641,250, Aug. 16, 1984, Pat. No. 4,568,748, which is a division of Ser. No. 425,151, Sep. 30, 1982, Pat. No. 4,477,669. This application Dec. 17, 1985, Ser. No. 809,959

Int. Cl.[4] C07C *127/19*

U.S. Cl. 564—54 **1 Claim**

1. 1,1-Di(p-fluorophenyl)urea.

4,698,445

4-AMINO BENZENESULFONAMIDES

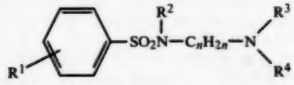
George C. Buzby, Jr., Blue Bell, and Thomas J. Colatsky, Paoli, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jun. 18, 1986, Ser. No. 875,816

Int. Cl.[4] C07C *143/80*

U.S. Cl. 564—86 **12 Claims**

1. A compound of the formula



in which

R^1 is $—NH_2$ or alkylamino of 1 to 3 carbon atoms, in 3- or 4-position of the benzene ring;

R^2 is branched chain alkyl of 3 or 4 carbon atoms;

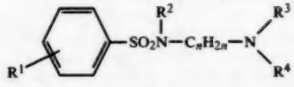
R^3 is hydrogen or straight or branched chain alkyl of 1 to 4 carbon atoms;

R^4 is straight or branched chain alkyl of 1 to 4 carbon atoms; and

n is one of the integers 2, 3 or 4;

or a pharmaceutically acceptable salt thereof.

2. A compound of the formula



in which

R^1 is alkanoylamino of 2 to 4 carbon atoms, in 3- or 4-position of the benzene ring;

R^2 is hydrogen or branched chain alkyl of 3 or 4 carbon atoms;

R^3 is hydrogen or straight or branched chain alkyl of 1 to 4 carbon atoms;

R^4 is straight or branched chain alkyl of 1 to 4 carbon atoms; with the proviso that R^3 and R^4 are branched chain alkyl when R^2 is hydrogen; and

n is one of the integers 2, 3 or 4;

or a pharmaceutically acceptable salt thereof.

4,698,446

SYNTHESIS OF POLYAMINES AND MIXTURE FORMED THEREBY, OF DIPRIMARY POLYALKYLENE POLYAMINES WITH DISUBSTITUTED N-ADJACENT TERMINAL CARBON ATOM(S)

John T. Lai, Broadview Heights, and Pyong N. Son, Akron, both of Ohio, assignors to The BF Goodrich Company, Akron, Ohio

Filed Jul. 1, 1986, Ser. No. 880,845

Int. Cl.[4] C07C *85/11*

U.S. Cl. 564—494 **6 Claims**

1. A process for preparing a polyamine comprising,

(i) mixing a nitroalkane (NA) having the structure

wherein, R^1 and R^2 represent H, C_1–C_{20} alkyl, C_5–C_7 cycloalkyl, C_2–C_{20} alkylether, C_2–C_{20} alkylaminoalkyl, and R^1 together with R^2 may be cyclized forming a ring with from about 5 to about 7 C atoms;

with an aliphatic amine reactant to form a mixture containing a salt intermediate, said amine reactant being selected from the group consisting of piperazine, substituted piperazines having substituents on the N or C atoms in the ring; an acyclic monoamine having a terminal primary amine group; a diprimaryamine with both terminal amine groups being primary; and, a polyalkylene polyamine (PAPA) with both primary and secondary amine groups, in which PAPA at least one primary or secondary amine group is a terminal group;

(ii) gradually adding to said mixture an essentially solvent-free aldehyde having the formula R^3CHO in at least an equimolar amount of the lesser of EDA or NA, wherein, R^3 represents represents H, C_1–C_{20} alkyl, preferably C_1–C_6 lower alkyl, C_6 aryl, and, C_4–C_7 cycloalkyl;

(iii) maintaining the temperature in the range from about 0° C. to about 50° C. while stirring to form a reaction mixture containing a nitroamine having a terminal nitro group; and,

(iv) contacting said reaction mixture with hydrogen in the presence of a catalytically effective amount of Raney Ni at a temperature in the range from about 15° C. to about 50° C. and a pressure in the range from about 50 psig to about 500 psig for a period of time sufficient to hydrogenate essentially all the nitro groups in said compounds;

whereby the yield of said polyamine is greater than 10 mol % of the nitroalkane converted to polyamines.

4,698,447

PROCESS FOR PRODUCTING 10-PHENYL-10H-PHENOXAPHOSHINE

David M. Blum, Bergen, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 14, 1986, Ser. No. 839,392

Int. Cl.[4] C07F *9/50*

U.S. Cl. 568—12 **6 Claims**

1. In a process for producing 10-phenyl-10-H-phenoxaphosphine, by

(1) mixing n-butyl lithium dissolved in C_5–C_{10} hydrocarbon with a solution of diphenyl ether in diethyl ether under an inert atmosphere;

(2) adding phenylphosphonous dichloride;

(3) adding water; and

(4) recovering and purifying the final product from the organic phase the improvement comprising the use of tetramethylethylenediamine in the solution of diphenyl ether and diethyl ether.

4,698,448

METHOD FOR MAKING AROMATIC PHOSPHORUS COMPOUNDS

Werner Ude, Darmstadt; Siegmund Besecke, Seeheim-Jugenheim; Achim Riemann, Marburg, and Guenther Schroeder, Ober-Ramstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jul. 2, 1985, Ser. No. 751,625

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1984, 3425282

Int. Cl.[4] C07F *9/53*

U.S. Cl. 568—14 **2 Claims**

1. A method for making an aromatic phosphorus compound of the formula

wherein R is methyl or phenyl, Ar is phenylene, and X is chlorine or fluorine, and at least 80 percent of said compound is present as the p,p'-isomer, which method comprises reacting one molar part of a compound $R—PCl_2$ with at least two molar parts of a compound H—ArX in the presence of at least one molar part of elemental sulfur, and of a Friedel-Crafts catalyst.

4,698,449

CRYSTALLINE SILICATES, AND PROCESSES FOR THE PRODUCTION OR USE THEREOF

Tetsuya Imai; Hiroshi Fujita, both of Hiroshima; Minoru Koikeda, and Takashi Suzuki, both of Yokohama, all of Japan, assignors to Research Association for Petroleum Alternatives Development, Tokyo, Japan

Division of Ser. No. 736,988, May 23, 1985, which is a continuation of Ser. No. 491,534, May 4, 1983, abandoned. This application Jul. 31, 1986, Ser. No. 891,337

Claims priority, application Japan, May 4, 1982, 57-73453; May 4, 1982, 57-73454; May 4, 1982, 57-73455

Int. Cl.[4] C07C *1/04*

U.S. Cl. 585—469 **6 Claims**

1. A process for the production of hydrocarbons, which comprises contacting the synthesis gas with a mixed catalyst of (a) a crystalline silicate having a chemical composition represented by the following formula in terms of mole ratios of oxides under a dehydrated state:

$$(0.1\text{–}2)\ R_{2/n}O.[aLa_2O_3.bCe_2O_3.ySiO_2]$$

in which R is at least one of mono- and divalent cations, n is the valence of R and $a+b=1$, $a \geqq 0$, $b \geqq 0$ and $y \geqq 12$, and (b) a carbon monoxide reducing catalyst at a temperature of 200° to 500° C. under a pressure of at most 300 atm.

4,698,450

POLYETHYLENE WAX

Hugo J. C. Nuttens, Schoten, and Gerard VanHaeren, Rixensart, both of Belgium, assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jan. 15, 1985, Ser. No. 691,951

Claims priority, application United Kingdom, Jan. 20, 1984, 8401567

Int. Cl.[4] C07C *2/02*; C08L *91/06*; C10L *1/16*

U.S. Cl. 585—520 **10 Claims**

1. A process for the preparation of a polyethylene wax

having Mn of from 250 to 3000 and a density of 0.930 to 0.950, comprising polymerizing ethylene at a pressure of at least 800 bar, at a temperature of from 150° to 270° C., in the substantial absence of solvent and in the presence of a carbonyl compound as chain transfer agent, forming the desired wax product, and treating the formed wax product to remove at least a part of the light end containing up to 34 carbon atoms.

4,698,451

DIRHENIUM METATHESIS CATALYSTS

Steven P. Diefenbach, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Jun. 17, 1986, Ser. No. 875,085
Int. Cl.[4] C07C *2/00*; B01J *31/00*
U.S. Cl. 585—534 **34 Claims**

1. A complex formed from (i) a dirhenium halide having (a) a double or triple bond between a pair of rhenium atoms, and (b) a bis(dihydrocarbylphosphino)alkane coordinated therewith, and (ii) a Group III-A alkoxide in which the alkoxy groups are perfluorinated or are substantially perfluorinated.

11. In a process of catalytically metathesizing a metathesizable acetylene compound, the improvement in which said compound is contacted with a catalyst formed from (i) a dirhenium halide having (a) a double or triple bond between a pair of rhenium atoms, and (b) a bis(dihydrocarbylphosphino)alkane coordinated therewith, and (ii) a Group III-A alkoxide in which the alkoxy groups are perfluorinated or are substantially perfluorinated.

4,698,452

ETHYLENE LIGHT OLEFINS FROM ETHANOL

Raymond Le Van Mao, and Le H. Dao, both of Montreal, Canada, assignors to Institut Nationale de la Recherche Scientifique, Sainte-Foy, Canada

Filed Oct. 2, 1986, Ser. No. 914,295
Int. Cl.[4] C07C *1/20, 1/24*
U.S. Cl. 585—640 **13 Claims**

1. A process for producing C_2–C_4 olefins in yields higher than 94% by weight comprising sending ethanol or aqueous solution of ethanol as feed over a Mn-Zn modified [illegible]tasil-type zeolite catalyst, modified by incorporation of Zn by ion-exchange and subsequent incorporation of Mn by dry impregnation using an aqueous solution of a Mn salt in the presence of bentonite, said process being carried out at a temperature ranging from 300° to 450° C.

4,698,453

PROCESS FOR SEPARATION OF SUBSTITUTED BENZENE ISOMERS

Kishio Miwa; Yukiko Nagaoka, both of Kamakura, and Takehisa Inoue, Tokyo, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Division of Ser. No. 515,927, Jul. 20, 1983, Pat. No. 4,571,441.
This application Dec. 13, 1985, Ser. No. 785,488
Claims priority, application Japan, Dec. 28, 1982, 57-231207
Int. Cl.[4] C07C *7/12*
U.S. Cl. 585—828 **3 Claims**

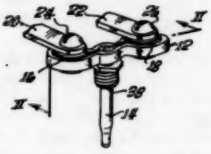
1. A process for separating 1,3,5-trimethylbenzene from an isomer mixture containing 1,3,5-trimethylbenzene, 1,2,3-trimethylbenzene and 1,2,4-trimethylbenzene which comprises contacting the isomer mixture with an adsorbent of a zeolite of the Y type containing at least one cation selected from the group consisting of an Ag cation and a Cu cation and at least one cation selected from the group consisting of an Na cation and a K cation, whereby 1,3,5-trimethylbenzene is separated and recovered as a raffinate component, and expelling the isomers adsorbed in the adsorbent by a desorbent to regenerate the adsorbent.

4,698,454

LIGHTWEIGHT THERMOCOUPLE ASSEMBLY

M. Samuel Moore, Northridge, Calif., assignor to Semco Instruments, Inc., North Hollywood, Calif.

Filed Sep. 4, 1984, Ser. No. 646,822
Int. Cl.[4] H01L 35/02
U.S. Cl. 136—233 14 Claims



1. A thermocouple system comprising:

a thermocouple probe comprising an elongated, generally cylindrical probe housing having a base an outer wall and a closed outer end, a passageway extending from the base to a point near the end of said housing, the wall thickness of said probe housing from the base to a point near the outer end being relatively thick for increased strength, the wall thickness of said probe housing at and near the end of said housing being relatively thin, substantially equal to one-half or less than one-half of the thickness of the relatively thick wall, for rapid thermocouple response, and the outer wall of said thermocouple probe housing being tampered near the outer end thereof;

a pair of thermocouple wires of dissimilar metals mounted within and insulated from said housing, and extending to the outer end of said housing where they are joined to one-another;

said probe housing having two peripheral grooves, a first one immediately adjacent the base of said housing and a second groove spaced away from said base;

a terminal assembly swaged into said first groove, said terminal assembly including first and second spaced terminals;

said terminal assembly having a generally binocular exterior configuration with first and second spaced openings enclosing said first and second terminals, respectively, and each opening being substantially centered within and enclosed by a thin wall forming part of a terminal housing;

high temperature insulating means mounting said terminals in respective spaced openings in said terminal assembly;

said high temperature insulating means being fuse-bonded both to said terminals and to said walls of the terminal housing;

a washer swaged into said second groove;

threaded nut means rotatably mounted on said probe housing between said terminal assembly and said washer for mounting said assembly to a location where the temperature is to be measured; and

means for connecting said thermocouple wires to said respective terminals.

4,698,455

SOLAR CELL WITH IMPROVED ELECTRICAL CONTACTS

Bruce T. Cavicchi, Granada Hills; Hans G. Dill, Newhall, and Dieter K. Zemmrich, Northridge, all of Calif., assignors to Spectrolab, Inc., Sylmar, Calif.

Filed Nov. 4, 1986, Ser. No. 927,283
Int. Cl.[4] H01L 31/06
U.S. Cl. 136—256 11 Claims

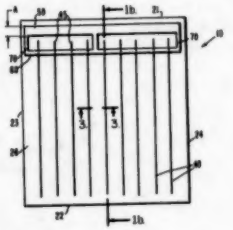
1. A solar cell comprising:

a first layer of semiconductor material of a first conductivity type;

a second layer of semiconductor material of a second opposite conductivity type disposed on said first layer forming a semiconductor junction therebetween, said first and second layers having first and second major essentially parallel surfaces, respectively, essentially parallel to said semiconductor junction;

a layer of aluminum gallium arsenide semiconductor material of said second conductivity type disposed on said second major surface and having an exposed front major surface essentially parallel to said second major surface and further having a plurality of grooves therein extending vertically therethrough to said second layer;

electrically conductive material filling said grooves and



electrically contacting said second layer to form metallic contact lines;

a flat conductive bar transversely disposed on said exposed front major surface across said grooves and making electrical contact to said electrically conductive material in said grooves;

an electrically conductive flat strip disposed on said exposed major surface and spaced apart from said conductive bar; and

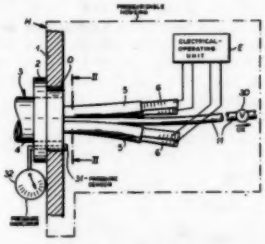
at least one electrically conductive bridge electrically coupling said conductive bar to said contact strip.

4,698,456

ELECTRICAL DEVICE FOR USE IN AN EXPLOSIVE ENVIRONMENT

Martin Hamacher, Westerholter Strasse 791, D-4352 Herten, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,841
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1984, 3438522
Int. Cl.[4] H05K 5/06; H02G 3/18
U.S. Cl. 174—11 R 8 Claims



1. An electrical apparatus, especially for use in an explosive environment, comprising:

a pressure-retention housing having a wall formed with an opening;

an electrical unit received in said housing;

a cable feedthrough received in said opening and sealing the interior of said housing from the environment at said opening;

an electrical cable comprising a plurality of electrical conductors within a sheath, said electrical cable traversing

said feedthrough and said electrical conductors being connected to said unit; and

a passage extending through said feedthrough and into said housing for pressurizing the interior of said housing with a gas under pressure, said passage formed by a pressurizing-gas tube extending through said cable and incorporated therein together with said conductors.

4,698,457

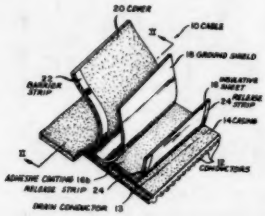
STRIPPABLE SHIELDED ELECTRICAL CABLE ASSEMBLY

Hosrow T. Bordbar, Stanton, Calif., assignor to Thomas & Betts Corporation, Raritan, N.J.

Filed Sep. 25, 1985, Ser. No. 779,917

Int. Cl.[4] H01B 7/08

U.S. Cl. 174—36 **8 Claims**



1. A shielded electrical cable assembly comprising:

a plurality of elongate, spaced electrical conductors;

an elongate electrically insulative casing surrounding and electrically isolating said conductors;

an elongate electrically conductive shield overlying said casing;

an elongate cover overlying said shield, and

an elongate insulative sheet disposed between said shield and said casing adhesively bonded on one side of said insulative sheet through said shield to said cover and bonded directly to said casing on the other side, said insulative sheet including along one longitudinal edge on said other side, a continuous release strip for providing a non-bonded relation between said insulative sheet and said casing to facilitate stripping of said casing from said assembly.

4,698,458

JOINT FOR CABLES WITH AN EXTRUDED INSULATION

Bruno Parmigiani, and Gianmario Lanfranconi, both of Milan, Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan, Italy

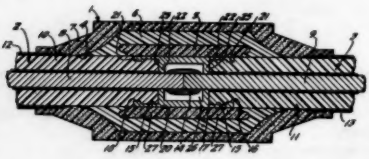
PCT No. PCT/EP85/00500, § 371 Date Apr. 15, 1986, § 102(e) Date Apr. 15, 1986, PCT Pub. No. WO86/02210, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 26, 1985, Ser. No. 860,319

Claims priority, application Italy, Sep. 28, 1984, 22912

Int. Cl.[4] H02G 15/184, 15/103

U.S. Cl. 174—73 R **4 Claims**



1. A joint between a pair of cables, each cable having a conductor surrounded by extruded insulation, said joint comprising:

end portions of said cables with portions of said extruded insulation removed adjacent the ends of said cables to provide bare conductor portions extending from exposed ends of the remaining said extruded insulation;

conductive means mechanically and electrically interconnecting said bare conductor portions and disposed intermediate said exposed ends of said extruded insulation, said conductive means having an exterior size smaller than the exterior size of said extruded insulation;

a tubular metal adaptor disposed around said conductive means and having a pair of spaced walls extending from said tubular metal adaptor toward and transversely to said conductor portions, one of said walls abutting one of said exposed ends of said extruded insulation and the other of said walls abutting the other of said exposed ends of said extruded insulation, each said cable having an annular groove in said extruded insulation thereof adjacent but spaced from its exposed end and said tubular metal adaptor having insulation engaging ribs at axially opposite ends thereof, one of said insulation engaging ribs at one of said ends of said tubular metal adaptor extending into said groove of the extruded insulation of the cable adjacent thereto and the other of said insulation engaging ribs at the other end of said tubular metal adaptor extending into said groove of the extruded insulation of the other cable adjacent thereto for preventing movement of said exposed ends away from said walls; and

a monolithic sleeve of insulation having a conductive electrical field modifier at the inner surface thereof and which extends circumferentially of said inner surface and has an exposed inner surface, said modifier having an axial length at least equal to the axial length of said tubular metal adaptor and said monolithic sleeve being disposed with said modifier in contact with and surrounding said tubular metal adaptor, with one of its ends surrounding and engaging said extruded insulation of one of said cables and with the other of its ends surrounding and engaging said extruded insulation of the other of said cables.

4,698,459

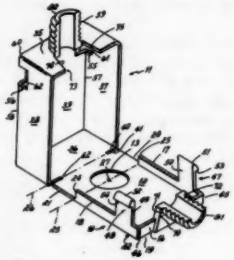
BATTERY CONNECTION PROTECTOR CASE

Robert C. Drake, Cincinnati, Ohio, assignor to Dorman Products, Inc., Cincinnati, Ohio

Filed Oct. 8, 1986, Ser. No. 916,526

Int. Cl.[4] H01R 13/52, 13/50, 13/44; H01M 2/02

U.S. Cl. 174—138 F **8 Claims**



1. A protective case for an electrical connection between a battery cable end and a battery terminal post, said case comprising

a base having a floor, said floor having a bore through which said post can be received,

a cap having front, rear, side, and top walls, said cap cooperating with said base to provide a substantially closed housing within which said connection is located when said case is in use,

a hinge connecting the rear edge of said base to said rear

wall of said cap, said base, cap and hinge all being of a one-piece molded construction,

alignment structure partially carried by said base and partially carried by said cap, said base and cap alignment structure cooperating upon closure of said cap onto said base for ensuring that said base and cap are properly interfitted in order to provide a substantially closed housing, said alignment structure comprising a truncated guide wall portion which forms a part of the front wall of one of said base and said cap, and a truncated cutout section in the front wall of the other of said base and said cap, said truncated guide wall cooperating with said truncated cutout in order to guide said cap into proper closure relations with said base,

latch structure partially carried by said base and partially carried by said cap for retaining said cap in a closure attitude with said base; said latch structure comprising a latch access port defined in said cap and a latch flexibly connected to said base, said latch automatically engaging said latch access port upon closure of said cap with said base, said latch having a latch face, and said latch access port having a latch edge, said latch face and latch edge being adapted to overlie one another in latching relation, said latch being of a size and configuration relative to the size and configuration of said latch access port so as to not extend beyond the outer surfaces of said cap, said latch structure being incorporated with said case as part of said one-piece molded construction, and

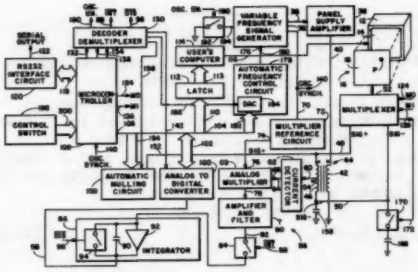
a cable collar including a cable collar section carried by said base and a cable collar section carried by said cap, that cable collar section carried by each of said base and cap being centrally oriented relative to said truncated guide wall and said truncated cutout.

4,698,460

TOUCH PANEL SYSTEM

Philip T. Krein; Robert D. Meadows, both of Portland; Bruce Murdock, Beaverton, and Daniel G. Teichmer, Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 26, 1986, Ser. No. 900,646
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—19 **15 Claims**



1. A touch panel device for determining the touch location at which a touch sensing surface of the device is touched comprising:

signal generator means for producing an alternating-current voltage output;

panel scanning signal applying means for applying panel scanning signals to the touch sensing surface, the panel scanning signal applying means having an input coupled to the first signal generator output, the panel scanning signal applying means having first and second panel scanning outputs comprising respective first and second alternating-current voltage panel scanning signals which are driven by the signal generator output and which are one hundred and eighty degrees out of phase from one another;

touch signal detection means having inputs coupled to the first and second panel scanning outputs and a touch signal output, the touch signal detection means comprising means for producing touch current signals at the touch signal output corresponding to the difference between the first and second panel scanning signals at the touch sensing output;

switching means for selectively coupling the first and second panel scanning outputs to the touch sensing surface so as to selectively apply the first and second panel scanning signals to the touch sensing surface and generate touch current signals at the touch sensing output upon touching the panel;

panel output signal processing means including an analog multiplier means with a first input coupled to the touch signal output for receiving the touch current signals, the analog multiplier means having a second input coupled to the second signal generator output for receiving reference signals derived therefrom and a multiplier output, the analog multiplier means comprising means for multiplying the received touch current signals and received reference signals to provide multiplier output signals corresponding to the received touch current signals, integrator circuit means having an integrator input coupled to the multiplier output for receiving the multiplier output signals, the integrator circuit means also having an integrator output, the integrator circuit means comprising means for integrating the multiplier output signals over integration time periods to provide an analog output of integrated multiplier output signals corresponding to the touch current signals during such integration time periods, analog to digital converter means having a converter input coupled to the integrator output for receiving the integrated multiplier output signals and for converting the integrated multiplier output signals to corresponding digital touch current signals, the analog to digital converter means having a converter output at which the digital touch current signals are provided; and

the panel output signal processing means also including processor circuit means having an input coupled to the converter output for receiving the digital touch current signals and comprising means for determining the touch location from the digital touch current signals, the processor circuit means having a synchronization input coupled to the second signal generator output and including means coupled to the integrator circuit means for synchronizing the integration time periods to the signal generator reference signal.

4,698,461

TOUCH PANEL WITH AUTOMATIC FREQUENCY CONTROL

Robert D. Meadows; Philip T. Krein, both of Portland, and Bruce Murdock, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 26, 1986, Ser. No. 900,567
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—19 **17 Claims**

1. A touch panel device for determining the touch location at which a touch sensing surface of the device is touched comprising:

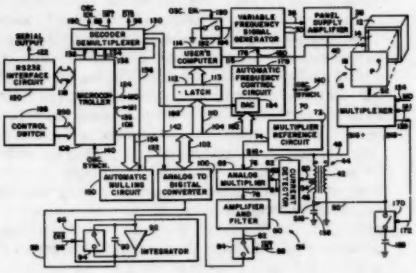
signal generator means for producing an alternating-current voltage output, the signal generator means having a frequency control input and comprising means for producing an alternating current voltage output of a frequency which is variable and controllable in response to a frequency control signal at the frequency control input;

panel scanning signal applying means for applying panel scanning signals to the touch sensing surface, the panel scanning signal applying means having an input coupled to the signal generator output, the panel scanning signal

applying means having first and second panel scanning outputs comprising respective first and second alternating-current voltage panel scanning signals which are driven by the signal generator output and which are one hundred and eighty degrees out of phase from one another;

touch signal detection means having inputs coupled to the first and second panel scanning outputs and a touch signal output, the touch signal detection means comprising means for producing touch signals at the touch current signal output corresponding to the difference between the first and second panel scanning signals;

switching means for selectively coupling the first and second panel scanning outputs to the touch sensing surface so as to selectively apply the first and second panel scanning signals to the touch sensing surface and generate touch



current signals at the touch signal output upon touching the touch sensing surface; and

panel output signal processing means having a first input coupled to the touch signal output for receiving the touch current signals, the panel output signal processing means comprising means for determining the touch location from the touch current signals, the panel output signal processing means including signal generator frequency control circuit means coupled to the frequency control input for automatically generating frequency control signals and applying such frequency control signals to the frequency control input, the frequency control means comprising means for automatically generating frequency control signals to shift the frequency of the signal generator means output away from fixed frequency interference spectra, such as due to cathode-ray-tube flyback signals, in the environment in which the touch panel device is used.

4,698,462

TROLLEYBUS CURRENT COLLECTOR SYSTEM ENABLING COMMON LINE PASSING

Emanuil S. Gaydarov; Koytcho Y. Russev; Vassil A. Paltchin, and Ivan T. Stoilov, all of Plovdiv, Bulgaria, assignors to Avtokombinat, Plovdiv, Bulgaria

Filed Jan. 16, 1986, Ser. No. 819,820

Claims priority, application Bulgaria, Jan. 16, 1985, 68406

Int. Cl.[4] B60L *5/34, 5/08*

U.S. Cl. 191—59.1 **6 Claims**

1. A trolleybus current collector system comprising:

a trolley pole, said trolley pole is operatively connected at its bottom part to the trolleybus;

an insulated carried, said carrier is operatively connected to the top part of the trolley pole;

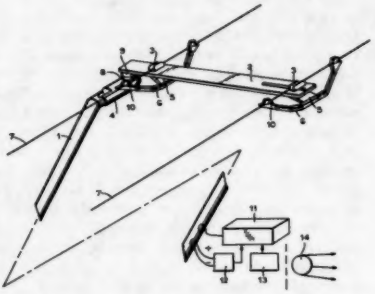
inner and outer adjacent current collector slide blocks, said blocks are arranged on the opposing ends of the insulated carrier;

a compression body, said body is operatively connected to said trolley pole at the outer end slide block relative to the driving direction of said carrier; the outer current collector slide block is rigidly mounted to said carrier while the inner current collector slide block is movably mounted in the longitudinal direction with respect to said carrier;

a current-carrying bridge having a respective internally diagonal deflector, said bridge is operatively mounted to each current collector slide block, and the compression body is fastened to said trolley pole parallel to a supply line;

a rocking unit having a fixing module, said rocking unit is operatively mounted on the compression body, and said rocking unit is connected at its other end to the outer end slide block of the carrier;

an elongating mechanism with a control input, said mechanism is operatively mounted to the front part of each current-carrying bridge;



a control block, and

a transducer, said control block being operatively connected via said transducer to the supply line;

a ray identifier, said identifier is operatively mounted on the front of the trolleybus, and

a ray emitter, said emitter is operatively mounted adjacent to said ray identifier, whereby the control input of the elongating mechanism is connected to the output of the control block, the first information input of which is connected via the transducer for direction to said supply line, while its second information input is connected to the output of the ray identifier.

4,698,463

REMOTE-CONTROL SWITCH FOR MOTOR-DRIVEN AUTOMOTIVE MIRROR

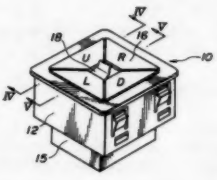
Morimasa Tanaka, Atsugi, and Tatsuo Kyoden, Isehara, both of Japan, assignors to Ichikoh industries Limited, Tokyo, Japan

Filed Aug. 7, 1986, Ser. No. 894,124

Claims priority, application Japan, Dec. 25, 1985, 60-290430; Dec. 25, 1985, 60-290431; Dec. 25, 1985, 60-290432; Dec. 25, 1985, 60-290433

Int. Cl.[4] H01H *9/00, 13/70*

U.S. Cl. 200—5 R **8 Claims**



1. A control switch for remote-control of the movement about a horizontal axis and a vertical axis, one at a time, of a right mirror and left mirror, which are rotatably supported on

an automobile and moved by motors, said control switch comprising:

(a) a holder;

(b) a circuit board mounted on said holder;

(c) a changeover switch for selecting either one of said light and left mirrors to be moved, mounted on said holder;

(d) first and second stationary contacts provided on said circuit board to be selectively connected through said changeover switch to a first terminal of said motors for moving said right and left mirrors about said horizontal or vertical axes;

(e) a third stationary contact provided on said circuit board connected in common to a second terminal of each of said motors;

(f) first to third stationary contact pairs provided on said circuit board, each stationary contact pair comprising two stationary contacts to be connected to the negative and positive polarities of an electrical power source, respectively;

(g) first to third bridge members formed of an electrically conductive elastic material, for selectively connecting said first to third stationary contacts to either one of the two stationary contacts comprising said first to third stationary contact pairs, respectively;

(h) an enclosure fixedly connected to said circuit board, to retain said first to third bridge members so that said first to third stationary contacts are normally connected to said stationary contacts of said first to third stationary contact pairs that are connected to the negative polarity of said electrical power source through asid first to third bridge members, said first to third bridge members being movably retained within said enclosure such that a first end of said first to third bridge members is slidable;

(i) actuating rods, independent of one another, provided within and movable with respect to said enclosure, having a first end in contact with said first end of said first to third bridge members, respectively, and having a second end projecting outward from said enclosure;

(j) a push-plate supported by said second ends of said actuating rods, for selectively engaging said actuating rods to move said slidable end of said first to third bridge members froma normal position to an actuated position.

4,698,464

CONTROL SWITCH FOR MOTOR DRIVEN REMOTE CONTROL MIRROR IN VEHICLE

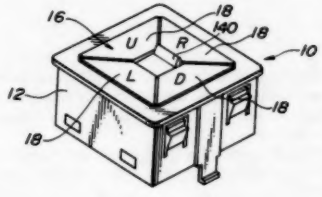
Morimasa Tanaka, Atsugi, and Shinichiro Ito, Nakatsugawa, both of Japan, assignors to Ichikoh Industries Limited, Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,682

Claims priority, application Japan, Dec. 25, 1984, 59-271941; Dec. 25, 1984, 59-271942; Jan. 14, 1985, 60-2320[U]

Int. Cl.[4] H01H *9/00, 13/70*

U.S. Cl. 200—5 R **13 Claims**



1. A control switch for tilting one or more mirrors rotatably supported in a vehicle around a horizontal or vertical axis under a remote control through two motors driven by a DC power source comprising:

first and second stationary contacts to be respectively connected to first terminals of said first and second motors for tilting the mirrors around a horizontal or vertical axis,

first and second stationary contact pairs respectively provided relative to said first and second stationary contacts and having two stationary contacts to be respectively connected to positive or negative polarity of said power source,

a third stationary contact to be commonly connected to the second terminals of said first and second motors,

a third stationary contact pair provided relative to said third stationary contact and having two stationary contacts to be respectively connected to the positive or negative polarity of said power source,

first, second and third bridge members formed of a conductive elastic material and respectively disposed to electrically connect between said first, second and third stationary contacts and said first, second and third stationary contact pairs provided relative to said first, second and third stationary contacts so that a first end of each of said bridge members is always in contact, respectively, with said first, second and third stationary contacts and a second end of each of said bridge members is in contact with the stationary contacts of any of said first, second and third stationary contact pairs,

first, second and third operating members arranged to respectively operate said first, second and third bridge members to connect said first, second and third stationary contacts to a first contact of said first, second and third stationary contact pairs to be connected with the negative polarity of said power source and to respectively operate said first, second and third bridge members so as to elastically deform said first, second and third bridge members to connect said first, second and third stationary contacts to a second contact of said first, second and third stationary contact pairs to be connected with the positive polarity of said power source, and

a plate member integrally formed to said first, second and third operating members, to selectively operate said first, second and third operating members when said plate member is depressed.

4,698,465

SWITCH

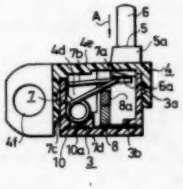
Hiroki Oba, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Oct. 17, 1986, Ser. No. 920,843

Claims priority, application Japan, Oct. 21, 1985, 60-159895[U]

Int. Cl.[4] H01H *1/12, 13/52, 15/02*

U.S. Cl. 200—16 F **3 Claims**



1. A switch comprising:

(a) a lower housing having a bottom wall and side walls defining an internal space therein;

(b) an upper casing having a guide hole in one part thereof mounted over said housing to enclose said internal space, said housing and casing being made of insulative material;

(c) a conductive plate mounted on one part of said bottom wall in said internal space of said housing having an elongated protuberance projecting upwardly along an upper surface of said plate;

(d) a first conductive contact mounted in said internal space of said housing spaced apart from said plate;

(e) a second conductive contact in the form of a coil spring placed on the upper surface of said plate, said coil spring having one end portion extending toward said first contact, and its other end portion extending substantially parallel to said protuberance of said plate and being disposed against said plate so as to abut against said protuberance and hold said coil spring in place when an actuation force is applied on said one end portion of said coil spring;

(f) a pair of terminals each connected with a respective one of said plate and said first contact and having ends extending externally from said housing; and

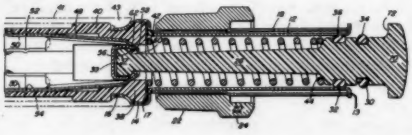
(g) a slide member received through said guide hole of said upper casing and reciprocable therethrough and having one end abutting said one end portion of said coil spring for bringing it into and out of conductive contact with said first contact upon actuation of said slide member.

4,698,466

AUTOMOTIVE SWITCH

Willi K. Beck, Hingham, and Lincoln V. Danielson, Seekonk, both of Mass., assignors to Joseph Pollak Corporation, Boston, Mass.

Filed Sep. 8, 1986, Ser. No. 904,489
Int. Cl.[4] H01H *3/16*
U.S. Cl. 200—61.78 **8 Claims**



1. A self-adjusting switch inserted between a fixed and a movable vehicle component comprising an insulating body having a cavity formed therein, a sleeve assembly joined to said insulating body, a plunger disposed in and relatively freely axially movable in said sleeve assembly, a fixed electrical contact relatively firmly retained in said cavity adjacent one end of said plunger, a movable contact relatively loosely mounted on said one end of said plunger, said contacts being adapted to be opened and closed in response to a predetermined amount of axial movement of said plunger, a cap at the other end of said plunger, and means for mounting said switch in said fixed vehicle component, said sleeve assembly being frictionally engaged and relatively tightly restrained against axial movement in said mounting means, whereby said cap forces said sleeve assembly through said mounting means in response to movement of said movable vehicle component relative to said fixed vehicle component greater than a predetermined amount.

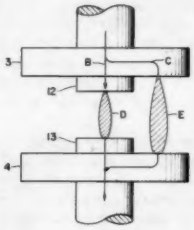
4,698,467

ELECTRODES OF VACUUM SWITCH

Eiji Kaneko, Yokohama; Satoru Yanabu, Machida, and Tohoru Tamagawa, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 24, 1985, Ser. No. 791,129
Int. Cl.[4] H01H *33/66*
U.S. Cl. 200—144 B **3 Claims**

1. An electrode structure disposed in a vacuum switch vessel comprising: a pair of electrodes disposed to be separable from each other in the vacuum switch vessel, and a pair of contacts fixed on opposing surfaces of said electrodes, respectively, each of said contacts having a diameter smaller than that of the correspondingly fixed electrode, said electrode material comprising copper and said contact material comprising a copper-chromium alloy comprising between about 25 and about 50% chromium, wherein both said electrode and contact materials satisfy a relation:



$$\frac{P_0}{\rho_0} > \frac{P_1}{\rho_1}$$

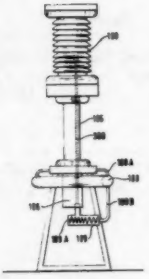
where P_0 and ρ_0 represent vapor pressure and electric resistance at a melting temperature of the material of the electrodes, and P_1 and ρ_1 represent vapor pressure and electric resistance at a melting temperature of the material of the contacts, the material of the contacts possessing values representing specific heat, heat of fusion and heat of evaporation which are $100 \pm 20\%$ with respect to values representing specific heat, heat of fusion and heat of evaporation of the material of the portion of said electrode other than that portion to which said contacts are fixed.

4,698,468

SULPHUR HEXAFLUORIDE CIRCUIT BREAKER USABLE AT VERY LOW OUTSIDE TEMPERATURES

Van Doan Pham, Meyzieu, France, assignor to Alsthom, Paris Cedex, France

Filed Apr. 15, 1987, Ser. No. 38,579
Claims priority, application France, Apr. 28, 1986, 86 06126
Int. Cl.[4] H01H *33/57, 33/70*
U.S. Cl. 200—148 B **7 Claims**



1. A sulphur hexafluoride circuit breaker usable at very low outside temperatures, the circuit breaker comprising:

a sealed enclosure containing a fixed contact assembly and a moving contact assembly;

a drive rod for driving the moving contact assembly, said rod being connected to a drive mechanism;

a blast volume;

a blast nozzle; and

a condenser located outside the enclosure and disposed in the vicinity of said drive mechanism and connected to the same potential, with the inside of the condenser being put into communication with the inside of the circuit breaker via at least one duct;

the circuit breaker further comprising first means for permanently taking a portion of the liquefied gas in the condenser and for vaporizing it by heating, and second means for conveying the resulting vapor into a thermally insulating enclosure, said enclosure being located in the vicinity of the arcing zone within the circuit breaker and communicating with the blast volume via an orifice.

4,698,469

SULFUR HEXAFLUORIDE CIRCUIT BREAKER OPERATING IN A VERY LOW TEMPERATURE ENVIRONMENT

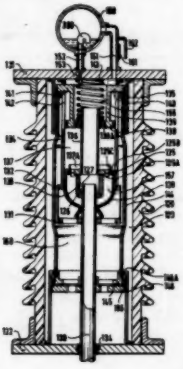
Van Doan Pham, Meyzieu, and Edmond Thuries, Pusignan, both of France, assignors to Alsthom, Paris, France

Filed May 14, 1986, Ser. No. 862,941

Claims priority, application France, May 15, 1985, 85 07437; Jul. 31, 1985, 85 11717; Feb. 10, 1986, 86 01771

Int. Cl.[4] H01H *33/57*

U.S. Cl. 200—148 E **30 Claims**



1. A high tension circuit breaker comprising a sealed enclosure having a fixed assembly and a moving assembly disposed therein, said fixed assembly and said moving assembly each including a respective main contact and a respective arcing contact forming an arcing zone, and said enclosure being filled with gas under pressure constituted, at at least in part, by sulfur hexafluoride, the circuit breaker including the improvement of a fluid condenser disposed outside the circuit breaker and subject to ambient temperature with the inside of the condenser being in communication with the inside of the enclosure via at least one first channel for transferring gas between the inside of the enclosure and the condenser, and via at least one second channel for transferring condensed, liquified gas from inside the condenser to the inside of the enclosure, and said second channel comprises means to supply liquified gas to said arcing zone.

4,698,470

MULTIPLE-IMPACT SHOCK-ABSORBING ASSEMBLY FOR CIRCUIT INTERRUPTER AND OTHER APPARATUS

Stanislaw A. Milianowicz, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 22, 1986, Ser. No. 866,183

The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.

Int. Cl.[4] H01H *3/60*

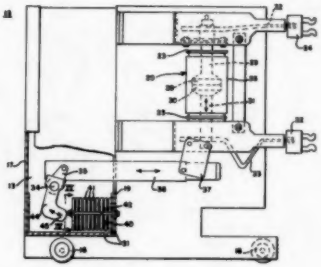
U.S. Cl. 200—288 **4 Claims**

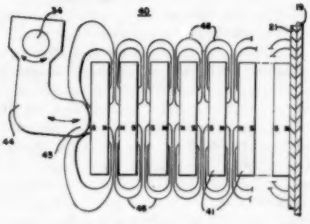
1. In combination with a circuit interrupter having a support structure and a movable contact that is placed in make-circuit and break-circuit relationship with a stationary contact by an operating mechanism having movable parts, means for decelerating and arresting the motion of the movable contact and associated movable parts of the operating mechanism during the contact-opening stroke of the interrupter after the contacts have been separated, said means comprising;

a compressible multiple-impact shock-absorbing assembly that is mounted on a stationary part of the circuit interrupter support structure which is proximate to a movable part of the interrupter operating mechanism and comprises a series of discrete magnetized metal bodies that are disposed in loosely stacked array, said discrete metal bodies being freely movable toward and away from one another and being so magnetized that adjacent bodies magnetically repulse one another and said discrete metal bodies are thereby spaced from each other and separated by air gaps when the shock-absorbing assembly is in relaxed non-compressed condition,

means holding said discrete magnetized metal bodies in loosely-stacked freely-movable array, and

means for impacting said shock-absorbing assembly comprising a striker that is coupled to said movable part of the





interrupter operating mechanism and disposed to advance toward and move away from the compressible shock-absorbing assembly during the contact-opening and contact-closing strokes, respectively, of the circuit interrupter in synchronism with the movement of the movable contact by said operating mechanism,

said compressible multiple-impact shock-absorbing assembly being so positioned that, at a predetermined time during the contact-opening stroke of the circuit interrupter, the striker advances toward and hits the shock-absorbing assembly and moves along a path which propels the discrete metal body that is disposed at the end of the assembly which is located adjacent to and is hit by the striker with sufficient velocity to overcome the magnetic force separating the struck discrete metal body from the adjacent discrete metal body and thus initiate a series of sequentially-occurring collisions and momentum exchanges between the respective freely-movable magnetized discrete metal bodies and the advancing striker which rapidly and progressively dissipates the kinetic energy gener-

ated by the operating mechanism and moving contact and thus quickly stops the advancing striker and terminates the contact-opening stroke of the circuit interrupter,

the operating mechanism of the circuit interrupter including a main operating shaft and the striker being coupled to said main operating shaft, and

the main operating shaft being rotatable and the striker comprising a lever which protrudes from the main operating shaft and being so disposed that the angular orientation of said lever has a fixed predetermined relationship to the position of the movable contact.

4,698,471

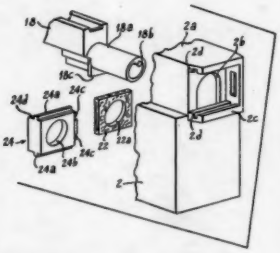
TRIGGER OPERATED PORTABLE ELECTRIC TOOL SWITCH

Earl T. Piber, Oconomowoc, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 781,625, Sep. 30, 1985, Pat. No. 4,665,290. This application Dec. 9, 1986, Ser. No. 939,664

Int. Cl.[4] H01H *13/06*

U.S. Cl. 200—302.2 **6 Claims**



1. A trigger operated switch comprising, in combination:

a housing having an opening in an end wall;

switch contacts within said housing operable between circuit ON and circuit OFF condition;

trigger operator means for controlling operation of said switch contacts, said trigger operator means comprising a first member disposed within said housing for operative connection with said switch contacts and having a shaft projecting through said opening in an extended position of said first member and a second member disposed externally of said housing attached to an outer end of said shaft, said trigger operator means being reciprocally movable in an axial direction of said shaft through said opening;

means biasing said trigger operator to said extended position;

a three-sided cage formed on said end wall defining a recess in said end wall around said opening, an opposed pair of sides of said cage having grooves extending transversely to said axial direction of said shaft;

a seal member disposed around said shaft within said recess; and

a cap having an aperture for said shaft slidably received in said grooves for overlying said seal member and retaining said seal member in said recess.

4,698,472

MICROWAVE HEATING STAND WITH ELECTRICALLY ISOLATED REFLECTOR

David H. Cox, Robinsdale, and David W. Andreas, Minneapolis, both of Minn., assignors to Golden Valley Microwave Foods Inc., Eden Prairie, Minn.

Filed Sep. 8, 1986, Ser. No. 904,634

Int. Cl.[4] H05B *6/80*

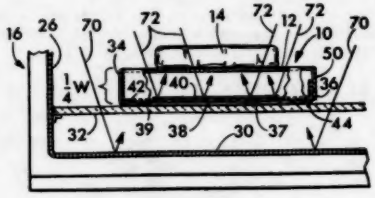
U.S. Cl. 219—10.55 E **6 Claims**

1. A foldable and collapsible microwave heating stand that can be shipped flat in a food package and erected to provide a support for facilitating the heating of food in a microwave oven comprising,

a body formed of hinged panels composed of paper or paperboard including a lower panel, side panels and an upper panel defining an upper support surface for supporting a food article thereon, said lower panel being spaced below the supporting surface by a distance of about ¼ wave length of the microwave energy supplied by the oven, whereby when said microwave energy has a wavelength of 12 cm. said distance between the upper and lower panels is about 2.5 to 3 cm.,

a microwave reflective sheet substantially aligned below the support surface, said lower panel

having an opening, an electrically non-conductive moisture free support sheet bonded across the opening and said



reflective sheet being bonded to the support sheet and being smaller than the opening so as to be thereby isolated electrically from the paper or paperboard,

whereby microwave energy from the oven striking the reflective sheet from above is reflected upwardly therefrom such that the reflective surface acts as an artificial oven floor forming a region of concentrated phase-reinforced microwave energy inside the food or at the surface of the food article resting upon said upper support surface to thereby enhance the heating of the food and the isolation of the reflective sheet from the paper or paperboard inhibits scorching, arcing or burning around the reflective sheet.

4,698,473

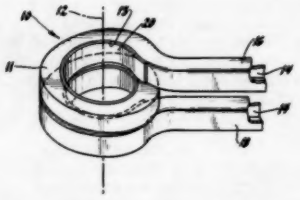
REFRACTORY METAL-LINED INDUCTION COIL

William V. Alcini, Ypsilanti, and Steven L. Avery, Saginaw, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 2, 1986, Ser. No. 858,735

Int. Cl.[4] H05B *6/44*

U.S. Cl. 219—10.79 **2 Claims**



1. A durable inductor for heating a metal workpiece, said inductor comprising

a copper coil suitable for conducting an alternating electrical current to create a fluctuating magnetic field for inductively heating a workpiece within said field, said copper coil having a surface oriented to face a workpiece within said field during heating, and

a protective metal lining bonded to said workpiece-facing copper coil surface and substantially composed of a metal selected from the group consisting of molybdenum and tungsten.

4,698,474

WELDING TONGS FOR CONNECTING TWO ABUTTING PIPE ENDS BY ARC WELDING

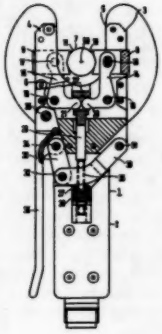
Siegfried Gügel, Erlangen; Dieter Pellkofer, Herzogenaurach, and Siegfried Förner, Erlangen, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim/-Ruhr, Fed. Rep. of Germany

Filed Apr. 26, 1985, Ser. No. 727,517

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1984, 3415755

Int. Cl.[4] B23K *9/02, 37/02*

U.S. Cl. 219—60 A 10 Claims



1. Welding tongs for connecting two abutting pipe ends to each other by arc welding, comprising two rigid jaws, a clamping device in the form of two symmetrical clamping jaws guided in said rigid jaws in a radial direction of a surface of a pipe, said clamping jaws having contact surfaces adapted to the surface of a pipe for holding at least one pipe end, two angle levers each being connected to a respective one of said clamping jaws, a tie rod connected to said angle levers, a first handle integral with said rigid jaws, an operating system including a first lever through which said tie rod passes, a second lever having a second handle protruding therefrom, and a strap, a first fastener connecting said first lever to said first handle, a second fastener connecting said first lever to said strap, a third fastener connecting said second lever to said strap, a fourth fastener connecting said second lever to said first handle, said second and third fasteners being separate from said first handle,

said first and second levers and said strap operating together in the vicinity of an extended position thereof in which said second, third and fourth fasteners are disposed along a straight line,

a spring member biased between said tie rod and said operating system,

said strap and said second lever forming a knee joint movable beyond said extended position for locking pipe ends into the welding tongs,

a track, a welding electrode disposed on said track, and a motor connected to said electrode for moving said electrode along said track relative to said clamping jaws.

4,698,475

MACHINE TOOL PALLET THAT CLAMPS THE WORKPIECE TO THE PALLET

Michael Lothenbach, Lucerne, and Peter Herzog, Buochs, both of Switzerland, assignors to AG fur Industrielle Elektronik AGIE, Losone, Switzerland

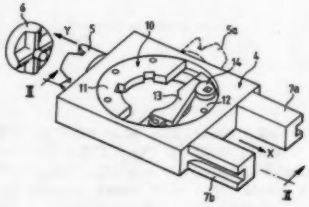
PCT No. PCT/CH84/00031, § 371 Date Oct. 18, 1984, § 102(e) Date Oct. 18, 1984, PCT Pub. No. WO84/03242, PCT Pub. Date Aug. 30, 1984

PCT Filed Feb. 27, 1984, Ser. No. 673,703

Claims priority, application Switzerland, Feb. 28, 1983, 1095/83

Int. Cl.[4] B23H *7/02;* B23Q *3/06, 3/15*

U.S. Cl. 219—69 W 18 Claims



4. In a wire-cutting spark erosion machine system having a wire or strip-like machining tool, a workpiece pallet comprising a pallet frame including means for operatively securing the pallet with respect to the machine and means for coupling the pallet with an external transfer mechanism for transferring the pallet to and from the machine, the pallet frame having an opening formed in it; means disposed in the opening for holding a workpiece during machining, including a stop, a movable clip associated with the stop for clamping the workpiece between the stop and the clip and means for operating the clip to place it in a clamping position; the securing means and the coupling means being attached to different surfaces of the pallet frame in approximately the plane of the opening.

4,698,476

AUTOMATIC WIRE FEEDER FOR AN ELECTRICAL DISCHARGE MACHINING APPARATUS INCLUDING COMBINED CLEANING FLUID AND WORKING FLUID SUPPLY SYSTEMS

Masahiro Yamamoto, and Takeshi Yatomi, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

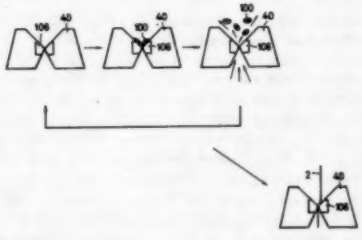
PCT No. PCT/JP83/00130, § 371 Date Jan. 5, 1984, § 102(e) Date Jan. 5, 1984, PCT Pub. No. WO83/03991, PCT Pub. Date Nov. 24, 1983

PCT Filed Apr. 28, 1983, Ser. No. 574,093

Claims priority, application Japan, May 6, 1982, 57-75740

Int. Cl.[4] B23H *7/02, 1/10*

U.S. Cl. 219—69 W 17 Claims



1. In an electrical discharge machining apparatus of the type

including a lower die guide disposed below a conductive material to be machined, the improvement comprising means for selectively injecting one of a working fluid and a cleaning fluid in the vicinity of said lower die guide, said means for injecting said cleaning fluid including means for pressurizing said cleaning fluid and means for directing said cleaning fluid against a bottom of said lower die guide to remove dust from said lower die guide, said means for injecting said cleaning fluid being rendered operable upon at least one of: (a) the completion of an electrical discharge machining operation, and (b) when an electrode wire of said electrical discharge machining apparatus begins to be fed.

4,698,477

ELECTRICAL DISCHARGE MACHINING APPARATUS WITH FORCED COOLING SYSTEM

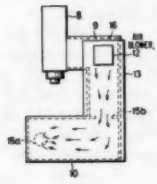
Jun Aramaki; Toshiharu Karashima; Takuji Magara, and Minoru Ushida, all of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1985, Ser. No. 741,056

Claims priority, application Japan, Jun. 4, 1984, 59-113138; Jun. 6, 1984, 59-114464; Jun. 6, 1984, 59-114465

Int. Cl.[4] B23H *1/00*

U.S. Cl. 219—69 R **9 Claims**



1. An electrical discharge machining apparatus, comprising:
(a) a hollow horizontal bed (10),
(b) a machining tank (1) mounted on one end of the bed and containing a workpiece (5) immersed in a machining liquid (2),
(c) a hollow vertical column (9) upstanding from another, opposite end of the bed,
(d) means (15*b*) establishing communication between the hollow interiors of the bed and the column,
(e) a head (8) outstanding from an upper portion of the column and disposed above the tank,
(f) a spindle (4) carrying a machining electrode (3) facing the workpiece and mounted for axial movement within the head,
(g) a cover member (13) surrounding outer surfaces of the bed and column and spaced from said outer surfaces to define an air flow passage therewith,
(h) internal aperture means (15*a*) defined in one of the bed and the column at one end of the air flow passage for establishing communication between said hollow interiors and said passage, and
(i) means (12, 16) disposed proximate another, opposite end of the air flow passage for forcing cooling air in a first direction through one of the hollow interiors and the air flow passage, through the internal aperture means, and in a second, opposite direction through another of the hollow interiors and air flow passage to minimize non-uniform thermal deformations in the apparatus and reduce attendant machining inaccuracies.

4,698,478

METHOD AND APPARATUS FOR RETHREADING THE ELECTRODE WIRE OF A TRAVELLING WIRE EDM APPARATUS THROUGH THE CUT IN A WORKPIECE

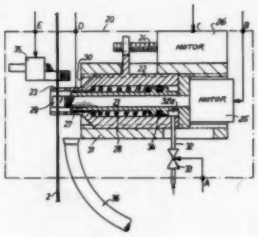
Roger Girardin, Vernier, Switzerland, assignor to Charmilles Technologies S.A., Geneva, Switzerland

Filed May 13, 1986, Ser. No. 862,768

Claims priority, application Switzerland, May 13, 1985, 2031/85

Int. Cl.[4] B23H *7/02*

U.S. Cl. 219—69 W **22 Claims**



1. In a method for rethreading the wire electrode of a travelling wire EDM apparatus through a cut effected by said wire electrode in a workpiece in the course of cutting said workpiece by electrical discharge occuring in a machining zone between said workpiece and said electrode wire, said electrode wire having been accidentally ruptured in the course of said cutting, said method comprising the steps of straightening said wire by effecting a pull on said wire, cutting off said wire and threading said wire through the cut in the workpiece, the improvement comprising the steps of passing the wire upstream of said machining zone through the bifurcated end of a rotatable shaft, rotating the shaft after rupture of the wire such as to wind around the shaft bifurcated end the end portion of the wire between the shaft bifurcated end and the ruptured end of the wire and such as to apply on the portion of the wire between the shaft bifurcated end and a wire braking means a pull sufficient to straighten the wire, cutting off the wire at a portion thereof which has been straightened, disposing of the length of wire wound around the shaft bifurcated end by pushing the wound bundle of scrap wire from said bifurcated end, and threading the end of the straightened portion of the wire through the cut in the workpiece.

4,698,479

BEAM DELIVERY SYSTEM FOR A CO_2 LASER

Joseph F. Rando, Los Altos Hills, and Henry W. Jones, San Leandro, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Continuation of Ser. No. 577,343, Feb. 6, 1984, abandoned. This application Oct. 30, 1986, Ser. No. 925,503

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121 LV **11 Claims**

1. A beam delivery system for delivering a laser beam from a laser to a point in space under robot control at a work station and wherein the robot is of the kind having a fixed base and an articulated mechanism comprising at least a shoulder joint, a wrist joint and a linkage suspending the wrist joint from the shoulder joint,

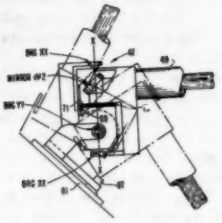
the beam delivery system being separate from the robot, with a beam path outside of and separated from and having different movements from those of the articluated mechanism,

said beam delivery system comprising,

shoulder joint means having an inlet for receiving the input beam directly from the laser, an outlet for transmitting the beam to a wrist joint means, two rotatable internal mirrors, and wherein the shoulder joint means include means

for redirecting the beam angularly about two orthogonal axes so that the beam at the outlet can be redirected in any angular direction away from the shoulder joint means, limited only by any end limits to arcuate movement in the shoulder joint means,

wrist joint means connected to be manipulated by the wrist joint of the robot and having an inlet for receiving the beam as redirected by by the shoulder joint means, an outlet for transmitting the beam to a desired point in space at the work station, and a plurality of internal mirrors, and wherein the wrist joint means include means with up to three mirrors for redirecting the beam angularly in any direction limited only by any end limits to arcuate movement in the wrist joint means, to the work station at the



desired point in space, the two mirrors in the shoulder joint means being closely coupled and the internal mirrors in the wrist joint means being closely coupled so that each joint means approximates a spherical optical joint, and

telescoping sealed tube means for conducting the beam directly and in a straight line from the outlet of the shoulder joint means to the inlet of the wrist joint means so that the only mirrors in the beam delivery system between the output of the laser and the output of the wrist joint are the mirrors in the shoulder joint means and the wrist joint means, the telescoping sealed tube means including mechanical joint means at each end for permitting it relative motion in accordance with the redirection of the beam at the shoulder joint means and the wrist joint means.

4,698,480

COMPUTER CONTROLLED MACHINE FOR PUNCHING AND THERMAL CUTTING OF WORKPIECES

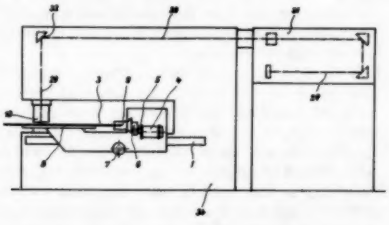
Hans Klingel, Moglingen, Fed. Rep. of Germany, assignor to Trumpf GmbH & Co., Ditzingen, Fed. Rep. of Germany

Filed Mar. 21, 1985, Ser. No. 714,672

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1984, 3410913

Int. Cl.[4] B23K *26/00, 26/16*

U.S. Cl. 219—121 LG **31 Claims**



1. In a computer controlled machine for performing punching and thermal cutting of workpieces, the combination comprising:

A. a frame having a base and a head;

B. a ram assembly mounted on said head and including a ram member mounted for reciprocation on a vertical axis relative to said base and drive means for said ram member to effect such reciprocation;

C. first tool mounting means in said head including means for supporting a punch for reciprocation with said ram member;

D. second tool mounting means on said base including means for supporting a die in coaxial alignment with said axis of reciprocation of said ram member, said axis of reciprocation defining the work station and said tool mounting means being coaxial therewith;

E. a workpiece guidance system for moving a workpiece on said base of said frame below said ram assembly and along X and Y axes relative to said work station;

F. thermal cutting means including power generating means, a thermal cutting head mountable in one of said tool mounting means with its thermal cutting axis coaxially aligned with said axis of reciprocation of said ram member, and conduit means for coupling said head and power generating means;

G. waste removal means including a waste removal member mountable in the other of said tool mounting means, said machine including at last a portion of said conduit means for coupling to said thermal cutting head upon mounting in said one tool mounting means, and means for coupling said thermal cutting head and said portion of said conduit means upon such mounting; and

H. computer control means for selectively and alternately operating one of (i) said drive means for said ram member to reciprocate a punch and (ii) said thermal cutting means and for operating said guidance system to move a workpiece along said X and Y axes for operation thereon by the selected one of said ram member and thermal cutting means at said work station.

4,698,481

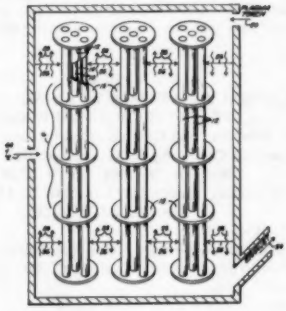
METHOD FOR PREVENTING DECOMPOSITION OF SILICON CARBIDE ARTICLES DURING HIGH TEMPERATURE PLASMA FURNACE SINTERING

Jonathan J. Kim, Williamsville, and Joel D. Katz, Youngstown, both of N.Y., assignors to Kennecott Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 718,374, Apr. 1, 1985. This application Mar. 25, 1986, Ser. No. 843,788

Int. Cl.[4] B23K *15/00*

U.S. Cl. 219—121 PY **17 Claims**



1. A method for preventing, halting, retarding or reversing the decomposition of silicon carbide articles during high temperature sintering in a plasma furnace comprising:

placing formed silicon carbide articles into at least one tube within a plasma furnace; and

sintering the silicon carbide articles in the plasma furnace

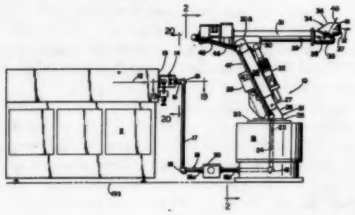
whereby a partial pressure of silicon gas builds up within the environment rendered by the tube thereby saturating the environment with silicon gas and other silicon vapor species, halting further decomposition of the silicon carbide articles.

4,698,482

LASER ROBOT

Robert C. Monteith, Milford, and Robert E. Borgmann, Cincinnati, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Mar. 17, 1986, Ser. No. 840,637
Int. Cl.[4] B23K *26/02*
U.S. Cl. 219—121 LV **4 Claims**



1. An improved laser robot, wherein
a plurality of robotic members are joined together and are relatively movable by
a power robotic drive means, said robotic members including
a hollow elongate forearm, having opposite ends, with
an articulatable robotic wrist carried at one end, said robotic wrist having
a plurality of wrist members mounted on plural axes of rotation, said forearm also including
a plurality of concentric drive tubes, rotatably carried therein on a common forearm axis, and drivingly connected to
a power wrist drive means and to said plurality of wrist members,
wherein the improvement comprises:
a laser generator;
a light pipe system, linking said laser generator to an end of said elongate forearm distal to said robotic wrist; and
a continuous laser beam pathway through said forearm and said robotic wrist, said beam pathway extending collinearly with said plural rotation axes of said wrist members.

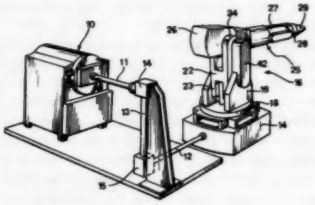
4,698,483

INDUSTRIAL ROBOT FOR WELDING AND CUTTING BY MEANS OF A LASER BEAM

Giorgio Marinoni, and Giuseppe Capello, both of Turin, Italy, assignors to Comau S.p.A., Grugliasco, Italy

Filed Nov. 26, 1986, Ser. No. 935,497
Claims priority, application Italy, Nov. 26, 1985, 54093/85[U]
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 LU **4 Claims**

1. An industrial robot for welding and cutting by means of a laser beam from an external source, of the type comprising:
a laser source,
a base,
a fork element supported by the base for rotation about a vertical axis,
an arm articulated at its first end to the said element about a substantially horizontal axis,
a forearm articulated to a second end of the arm about a substantially horizontal axis,
a wrist assembly fitted to the unarticulated end of the forearm, rotatable about an axis parallel to the forearm and having an end portion rotatable about an axis substantially perpendicular to the axis of rotation of the wrist assembly,
a lens for focusing the laser beam, supported by said end portion,
control means for rotating the fork element, the arm, the forearm, the wrist assembly and its end portion, respectively, and
means for guiding the laser beam inside the robot, wherein said guide means comprise:
a base plate located above the base,
a horizontal duct formed in the base plate and having a first end (**32*a***) disposed in correspondence with the thickness of the plate and a second end disposed centrally in correspondence with the vertical axis of the fork element,
a first mirror supported by the base plate in correspondence with the second end of the horizontal duct, for deflecting the laser beam from a horizontal direction to a vertical direction,
a tubular element disposed vertically and coaxially with the axis of rotation of the fork element, so that it serves to guide the beam from the first mirror to the axis of rotation of the arm relative to the fork element,
a second mirror disposed in correspondence with the axis of rotation of the arm relative to the fork element, for deflecting the beam from the vertical direction to a horizontal direction coaxial with the axis of rotation,



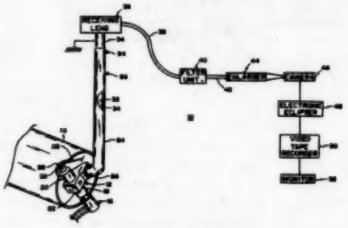
a protective case for the laser beam, supported laterally by the arm,
a third mirror supported by the case and disposed on the axis of rotation of the arm relative to the fork element, externally relative to the end of the fork element, this mirror being intended to deflect the laser beam from the direction coaxial with the axis of rotation to a direction parallel to the arm, inside the protective case,
a fourth mirror supported by the case and disposed on the axis of rotation of the forearm relative to the arm, for deflecting the laser beam from the direction parallel to the arm to a direction coaxial with the axis of rotation of the forearm relative to the arm,
a fifth mirror supported by the forearm on the axis of rotation of the latter relative to the arm, this mirror being intended to deflect the laser beam from the direction coaxial with the axis of rotation of the forearm relative to the arm to a direction parallel to the forearm and coaxial with the axis of rotation of the wrist assembly, and
an assembly of four mirrors inside the wrist assembly for deflecting the laser beam in a direction perpendicular to the axis of rotation of the wrist assembly, parallel to the said axis, again perpendicular to the axis coaxial with the axis of rotation of the end portion of the wrist assembly, and finally in a direction coaxial with the focussing lens for the laser beam, respectively.

4,698,484

WELDING MONITORING SYSTEM

Stephen G. Babcock, Westlake Village; Gerald E. Dyer, Canoga Park, and Stephen S. Gordon, Tarzana, all of Calif., assignors to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 5, 1987, Ser. No. 10,942
Int. Cl.[4] B23K *9/10*
U.S. Cl. 219—130.01 **10 Claims**



1. A welding monitoring system comprising:

an enclosure having at least two parallel sides and first and second aligned openings located in said parallel sides, said first and second openings having a first axis perpendicular to planes of said first and second openings;

a first mirror having an opening and a first reflective surface, said first mirror being mounted in said enclosure between said first and second openings, said first mirror being inclined 45° with respect to said first axis, and said first reflective surface being angularly oriented toward said first opening;

an elongated cylindrical housing open at one end, said housing positioned along and around said first axis;

coupling means for coupling said open end of said housing to said second opening in said enclosure, a welding electrode being extendable through said second opening in said enclosure, said opening in said first mirror, and said first opening in said enclosure;

a third opening in said enclosure, said third opening having a second axis perpendicular to a plane of said third opening, and said second axis being oriented perpendicular and to one side of said first axis;

a second mirror having a second reflective surface, said second mirror mounted in said enclosure adjacent said third opening, and said second mirror inclined 45° with respect to said second axis with said second reflective surface being angularly oriented toward said first mirror and said third opening;

a first elongated tubular support member having first and second ends and a third axis extending longitudinally through said first support member;

a second elongated tubular support member having first and second ends and a fourth axis extending longitudinally through said second support member, said second support member coupled at said first end to said second end of said first tubular member, with said third axis of said first support member perpendicular to said fourth axis of said second support member;

first rotatable coupling means for rotatably coupling said third opening of said enclosure to said first support member, said second axis of said third opening being in coaxial alignment with said third axis of said first tubular support member, whereby said welding electrode and said enclosure are rotatable about said second and third axes;

a third mirror having a third reflective surface, said third mirror mounted in an adjoining region between said first tubular support member and said second tubular support member, said third mirror inclined 45° with respect to said third and fourth axes, and said third reflective surface angularly oriented toward said second mirror and said second support member;

an image receiving means, including a lens, for receiving an image projected from said third mirror; and

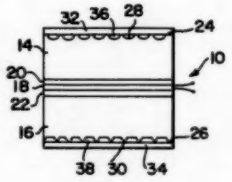
second rotatable coupling means for rotatably coupling said second tubular support member and said image receiving means, whereby said welding electrode and said enclosure are rotatable about said fourth axis, and an image of a welding operation taken through said first opening in said enclosure is projected by said first mirror to said second mirror, xand said second mirror projects said image to said third mirror, and said third mirror projects said image to said image receiving means.

4,698,485

HEATER DEVICE

Vincent P. Barkley, Arlington, Va., and William J. Siegel, Silver Spring, Md., assignors to Pace Incorporated, Laurel, Md.

Filed Aug. 6, 1985, Ser. No. 762,869
Int. Cl.[4] H05B *3/20*; B23K *1/12*
U.S. Cl. 219—228 **14 Claims**



1. A heater device suitable for heating a fluid to be applied to an object, said heater device comprising:

heat exchange means for heating a fluid to be contacted with a substrate, said exchange means including first and second heat exchange elements, said heat exchange elements having at least one passage through which fluid to be heated passes;

heating means disposed in a plane between said first and second heat exchange elements for heating said heat exchange means;

fluid entry means in flow communication with said first and second heat exchange elements for admitting fluid to be heated into said at least one passage;

fluid exit means in flow communication with said at least one passage for passing heated fluid from said at least one passage to said substrate to melt solder or the like thereon;

said fluid entering through said fluid entry means and exiting through said fluid exit means flowing in generally the same direction as said plane of said heating means.

4,698,486

METHOD OF HEATING SEMICONDUCTOR WAFERS IN ORDER TO ACHIEVE ANNEALING, SILICIDE FORMATION, REFLOW OF GLASS PASSIVATION LAYERS, ETC.

Ronald E. Sheets, Santa Ana, Calif., assignor to Tamarack Scientific Co., Inc., Anaheim, Calif.

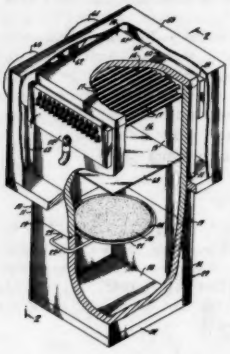
Continuation-in-part of Ser. No. 584,322, Feb. 28, 1984, abandoned. This application Feb. 7, 1985, Ser. No. 699,425
Int. Cl.[4] H01L *21/324*; F27D *11/02*
U.S. Cl. 250—492.2 **65 Claims**

1. A method of rapid annealing dopant-implanted semiconductor wafers, comprising:

(a) employing CW lamp means and an integrating light pipe to effect relatively uniform isothermal heating of a dopant-implanted semiconductor wafer to a relatively high

temperature less than the melting point of the semiconductor material forming said wafer,

(b) causing the aspect ratio to be at least 1, and



(c) maintaining said heating for a sufficient number of seconds to achieve rapid annealing.

4,698,487

PROCESS AND APPARATUS FOR THE HEAT TREATMENT OF MEALS

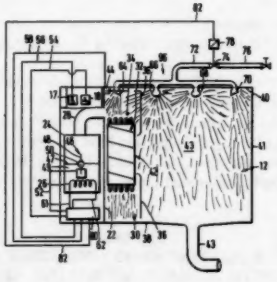
Siegfried Meister, Siemensstr. 2, 8910 Landsberg a. Lech, Fed. Rep. of Germany

Filed Jul. 31, 1985, Ser. No. 760,883

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1984, 3428648; Dec. 21, 1984, 3446863

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—506 **24 Claims**



1. An apparatus for the selective heat treatment of food, by steam or hot air, having a cooking area, characterized by heating means in said cooking area, and in that signal generator means **(94)** is provided for indicating a cooking area temperature above a predetermined value before starting a heat treatment, a heat sensor **(44)** in the cooking area **(12)** which is operatively associated with said signal generator and the signal generator is subject to the action of the heat sensor **(44)**, and cooling means associated with the cooking area and signal generator for at least partly actively cooling said cooking area to a temperature below said predetermined value so as to minimize burning of food during heat treatment.

4,698,488

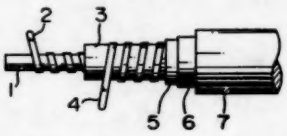
FLEXIBLE THERMOSENSITIVE WIRE

Yoshio Kishimoto, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 15, 1985, Ser. No. 723,627

Int. Cl.[4] H05B *3/34*

U.S. Cl. 219—549 **11 Claims**



1. A flexible thermosensitive wire, comprising a thermosensitive polymer composition layer formed between at least a pair of electrodes and covered with a jacket, said jacket being comprised of a plurality of layers including at least one barrier layer, said at least one barrier layer consisting essentially of a barrier polymer material which is impermeable to dry cleaning solvents so that said at least one barrier layer protects said thermosensitive polymer composition layer by functioning as a barrier to dry cleaning solvents.

4,698,489

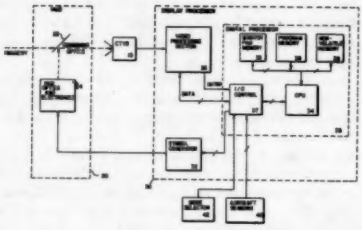
AIRCRAFT AUTOMATIC BORESIGHT CORRECTION

Charles W. R. Hickin, Binghamton, and Gene Tye, Endwell, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 428,767, Sep. 30, 1982, abandoned. This application Nov. 15, 1985, Ser. No. 798,535

Int. Cl.[4] G06F *15/58*; F41G *3/30, 5/26*

U.S. Cl. 235—407 **24 Claims**



1. An automatic boresight correction system for use in an aircraft having a gunnery system and a sighting system therefor, comprising:

a head-up display for displaying a boresight symbol through said sighting system, said boresight symbol representing a reference point for the prediction for the instantaneous positions of bullets fired from said gunnery system;

a video sensor for producing a sequence of video signals representing the instantaneous positions of said bullets;

a display processor for generating positioning data for said boresight symbol, said display processor including a video processing section, means for coupling video signals to said processing section for processing and storing the video signals representative of the relative positions of said bullets and said boresight signal as detected by said video sensor;

said display processor further including a boresight symbol generator; means for coupling the boresight symbol positioning data generated by said display processor to said boresight symbol generator to position said boresight symbol in response thereto;

means for actuating said boresight system; and

a digital processor in said display processor responsive to said actuating means for predicting the instantaneous positions of said bullets and for computing any error between said predicted and the instantaneous bullet positions sensed by said video sensor, said digital processor being further adapted to adjust the position of said boresight symbol data to compensate for said computed error.

15. A method for automatically boresighting a gunnery system in an aircraft having a sighting system including a bore sight symbol comprising the steps of:

firing several rounds from said gunnnery system;

detecting the actual positions of said fired rounds relative to said bore sight symbol;

computing a predicted trajectory of said fired rounds relative to said bore sight signal;

computing an error vector representative of the difference between predicted positions and the actual positions of said fired rounds; and

correcting said sighting systems to compensate for said difference according to said error vector.

4,698,490

OPTICAL CODE READER

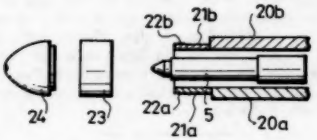
Koji Nakase, and Hiroaki Sasaki, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Mar. 10, 1986, Ser. No. 838,288

Claims priority, application Japan, Mar. 8, 1985, 60-33007[U]

Int. Cl.[4] G06F *7/10*

U.S. Cl. 235—472 **3 Claims**



1. An optical code reader comprising a case which encases a sensor, a cap which is directly in contact with an objective and a stopper.

4,698,491

DEVICE FOR ASCERTAINING ALIGNMENT ERRORS IN SHAFTS ARRANGED IN TANDEM

Heinrich Lysen, Munich, Fed. Rep. of Germany, assignor to Prüftechnik Dieter Busch & Partner GmbH & Co., Ismaning, Fed. Rep. of Germany

PCT No. PCT/EP84/00165, § 371 Date Feb. 1, 1985, § 102(e) Date Feb. 1, 1985, PCT Pub. No. WO84/04960, PCT Pub. Date Dec. 20, 1984

PCT Filed May 29, 1984, Ser. No. 699,418

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1983, 3320163

Int. Cl.[4] G01V *1/20*

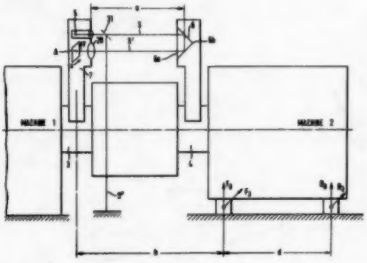
U.S. Cl. 250—201 **9 Claims**

1. Apparatus for ascertaining whether two shafts (3) and (4) arranged in tandem have their center lines aligned and the extent of any parallel and/or angular displacement thereof, said apparatus comprising:

a signal emitter positioned on the first of the shafts to be aligned to emit a signal indicative of the position of the first shaft;

a signal reflector positioned on the second of the shafts (4) to be aligned in the path of a signal from said emitter reflecting the signal received from said emitter back to the first shaft, said reflector comprising a rectangular reflecting prism system (6) arranged on the second shaft (4), with the plane of the prism hypotenuse (6a) of said prism system essentially perpendicular to the center line of the second shaft (4);

and a signal receiver positioned on the first shaft (3) to receive the signal reflected by said reflector and producing an electrical signal determined by the position at which the signal from said reflector impinges on said receiver, said signal receiver comprising a measurement receiver (7), arranged on the first shaft (3) and generating



two signals, which correspond to the coordinates (x,y) of the distance of the light-beam incidence point (A) from a fixed reference point (0) in a measurement plane essentially perpendicular to the center line of the first shaft (3), whereby one of said signals indicates parallel displacement of one shaft with respect to the other, and the other of said signals indicates angular displacement of one shaft with respect to the other.

4,698,492

FOCUS DETECTOR SYSTEM WITH A DISTORTION COMPENSATION MASK

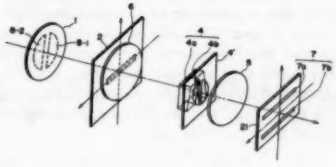
Keiji Ohtaka, Tokyo; Akira Hiramatsu, Yokohama; Yasuo Suda, Yokohama; Akira Akashi, Yokohama, and Akira Ishizaki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1985, Ser. No. 749,383

Claims priority, application Japan, Jul. 2, 1984, 59-137020

Int. Cl.[4] G03B *13/28*; G01J *1/20*

U.S. Cl. 250—201 **4 Claims**



1. A focus detection system comprising:

object optical means for forming an image of an object;

refocusing means for relaying a light flux from said object optical means and forming a plurality of component images having parallax;

light restriction means arranged between said object optical means and said refocusing means and having an aperture;

sensing means having a photo-sensor array for sensing said component images; and

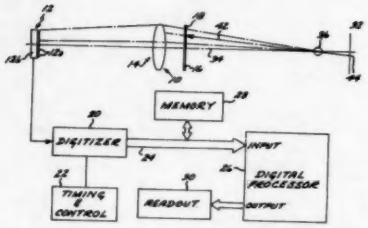
mask means for determining a shape of a photo-sensing area of said photo-sensor array in accordance with a distortion created in a long side of an aperture image by said refocusing means, said mask means having an aperture of a distorted long side for masking said photo-sensor array.

4,698,493

METHOD AND APPARATUS FOR MEASURING DISTANCE UTILIZING BINOCULAR OPTICS

David L. Fried, Placentia, Calif., assignor to D. L. Fried Associates, Inc., Placentia, Calif.

Filed Aug. 20, 1985, Ser. No. 767,485
Int. Cl.[4] G01J 1/36
U.S. Cl. 250—204 5 Claims



1. An optical distance measuring system comprising in combination,

a detector array having a multiplicity of detector elements in a single plane directed along a line of sight for a given field of view, each of said elements providing an electrical signal corresponding to information at a predetermined separate location in the field of view,

an optical system interposed between said array and said field of view including a pair of shutter mechanisms spaced from each other laterally of said line of sight for alternately exposing said array to said field through spaced apertures in said mechanisms respectively,

means for comparing the signals from said array from said alternate exposures to determine the displacement from one exposure to the other of predetermined signals as a measure of distance including means for insuring registration of said alternate exposures to accurately determine the displacement of a foreground object with respect to background objects from one to another of said exposures and for providing an indication of any misregistration δ developed from the equation

$$\delta = \alpha \frac{\Delta}{4} \frac{\Sigma_{i,j}[(m_{i,j} - m'_{i+1,j})^2 - (m_{i+1,j} - m'_{i,j})^2]}{\Sigma_{i,j}(m_{i,j} - m_{i+1,j})^2}$$

where α is a constant whose value is to be adjusted experimentally, but whose value is very nearly equal to unity, Δ is the center-to-center spacing of pixels, $m_{i,j}$ denotes the measured signal value for the $(i,j)^{TH}$ pixel on the frame with one shutter open and $m'_{i,j}$ is the measured signal value for the $(i,j)^{TH}$ pixel on the frame with the other shutter open, and the sum over i,j includes all of the pixels in the region of interest for which the range is to be determined,

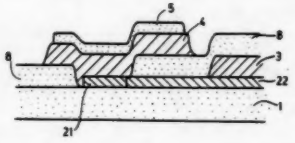
and readout means affording an indication of the said displacement.

4,698,494

IMAGE SENSOR AND METHOD OF MAKING

Toshiaki Kato, Kanagawa; Masakazu Ueno, and Masaharu Nishiura, both of Yokosuka, all of Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Jun. 6, 1986, Ser. No. 871,509
Claims priority, application Japan, Jun. 6, 1985, 60-123180; Jun. 11, 1985, 60-126579; Jun. 11, 1985, 60-126580
Int. Cl.[4] H01V 40/14
U.S. Cl. 250—211 R 11 Claims



1. An image sensor comprising

(a) a substrate,

(b) a plurality of individual electrodes disposed on one surface of the substrate, each individual electrode comprising a contact portion and a lead portion,

(c) an insulating film layer disposed over the individual electrodes,

(d) a semiconductor photoelectric conversion layer disposed on the insulating film layer, and

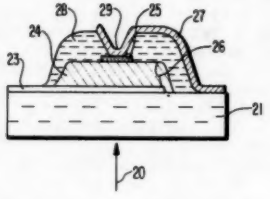
(e) a common electrode disposed on the semiconductor photoelectric conversion layer opposite the contact portion of the individual electrodes, wherein windows are formed in the insulating film layer such that contact is made between the contact portions of the individual electrodes and the semiconductor photoelectric conversion layer through the windows.

4,698,495

AMORPHOUS SILICON PHOTO-SENSOR FOR A CONTACT TYPE IMAGE SENSOR

Yuji Kajiwara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 743,840, Jun. 12, 1985, abandoned. This application Jan. 23, 1987, Ser. No. 8,108
Claims priority, application Japan, Jun. 12, 1984, 59-120410; Jun. 12, 1984, 59-120411
Int. Cl.[4] H01J 40/14
U.S. Cl. 250—211 R 4 Claims



1. An image sensor comprising a transparent insulator substrate, a common electrode formed on one surface of said insulator substrate, said common electrode being made of a transparent conductor, an amorphous semiconductor layer formed on said common electrode, an individual electrode formed on said amorphous semiconductor layer, an insulator layer covering said amorphous semiconductor layer and a periphery of said individual electrode, said insulator layer having an opening on a central portion of said individual electrode, and a wiring layer formed on said insulator layer, said

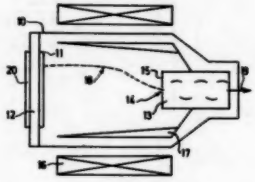
wiring layer contacting said central portion of said individual electrode through said opening.

4,698,496

IMAGE DISSECTOR TUBE WITH LIGHT FILTER

Pierre Dolizy, Ris-Orangis, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 3, 1985, Ser. No. 783,899
Claims priority, application France, Oct. 30, 1984, 84 16554
Int. Cl.[4] H01J *31/28, 40/16*
U.S. Cl. 250—213 VT **20 Claims**



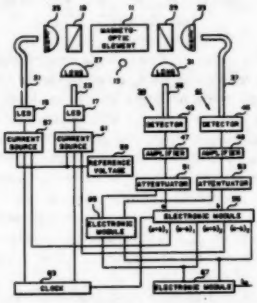
1. Photoelectric detection device comprising a vacuum chamber with a window formed by a substrate having an external surface outside the vacuum chamber and an internal surface inside the vacuum chamber, said substrate bearing a photocathode inside the vacuum chamber, the device being sensitive to incident light radiation between a short wavelength lower threshold λ_1 and a longer wavelength upper threshold λ_2, said thresholds defining the initial sensitivity range, the electrons emitted by the photocathode being focused, accelerated and deflected by electronic means to deliver signals or an image representative of luminous events projected onto the photocathode, characterized in that the window is provided with light filter means which eliminates wavelengths greater than a wavelength λ_f in the initial sensitivity range, such that $\lambda_1 < \lambda_f < \lambda_2$, where λ_f is determined when the initial sensitivity of the detection device is a given percentage of its maximum initial sensitivity.

4,698,497

DIRECT CURRENT MAGNETO-OPTIC CURRENT TRANSFORMER

Robert C. Miller, Salem Township, Westmoreland County, and Juris A. Asars, Murrysville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 22, 1986, Ser. No. 866,016
Int. Cl.[4] G01D *5/34;* **G01R** *31/00;* **G02F** *1/01;* **G01J** *4/00*
U.S. Cl. 250—231 R **10 Claims**



2. In combination with a magneto-optic element operating as a Faraday rotator to rotate the plane of polarization of polarized light passed through the element as a function of the magnitude of an electric current which may include a d-c component, an analyzer which splits the light emerging from the magneto-optic element into two orthogonal output beams and photodetectors which convert the output beams into electrical signals "a" and "b" such that a signal $(a-b/a+b)$ is proportional to the current;

means for alternately passing orthogonally, polarized first and second input light beams through the magneto-optic element to generate electrical signal a_1 and b_1 in response to said first input light beam and a_2 and b_2 in response to the second input light beam; and

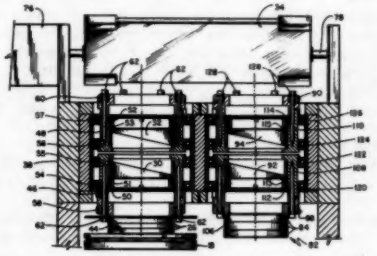
means for generating signals $(a-b)_1$, $(a+b)_1$, $(a-b)_2$ and $(a+b)_2$, for maintaining $(a+b)_1$ and $(a+b)_2$ constant, for maintaing $(a-b)_1+(a-b)_2$ equal to zero, and for generating an output signal $(a-b)_1-(a-b)_2$ proportional to said current.

4,698,498

THREE-DIMENSIONAL LASER IMAGING TRANSMITTER/RECEIVER

Thomas J. Mahoney, and Michael Lang, both of Boulder, Colo., assignors to Robot Defense Systems, Inc., Thornton, Colo.

Filed Apr. 28, 1986, Ser. No. 856,706
Int. Cl.[4] H01J *3/14*
U.S. Cl. 250—234 **29 Claims**



1. A transmitter/receiver apparatus for use in providing a three-dimensional display of a field of view, comprising:

a light source;

a lens system for use in collimating light from said light source;

a transmit pair of counter-rotating wedges communicating with said lens system for directing said light in a first direction;

transmit holder means for supporting said pair of transmit counter-rotating wedges;

transmit secondary gear means including at least a first transmit secondary gear, said first transmit secondary gear operatively engaging said transmit holder means;

a receive pair of counter-rotating wedges;

receive holder means for supporting said pair of receive counter-rotating wedges;

receive secondary gear means including at least a first receive secondary gear, said first receive secondary gear operatively engaging said receive holder means;

primary gear means including at least a first primary gear, said first primary gear operatively engaging each of said first transmit secondary gear and said first receive secondary gear;

vertical scanning means communicating with said light for directing said light in a second direction; and

a housing including outer walls and a casing, said casing being contained within said outer walls and providing support for said pairs of counter-rotating wedges, said lens system, said vertical scanning means, said primary gear means, and said transmit and receive secondary gear means.

4,698,499

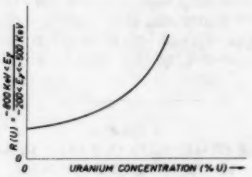
QUANTITATIVE EVALUATION OF URANIUM ORE ZONES

Harry D. Smith, Jr., Houston, Tex., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 562,875, Dec. 19, 1983, abandoned. This application Feb. 24, 1986, Ser. No. 832,181

Int. Cl.[4] G01V *5/00*

U.S. Cl. 250—256 **3 Claims**



3. A logging method for quantitatively evaluating the abundance of uranium in ore zones in the vicinity of earth formations penetrated by a borehole, comprising:

(a) obtaining with a borehole measurement system measurements in the borehole of the intensities of the natural gamma ray activity of the formation in at least two energy bands of a gamma ray energy spectrum, the first band encompassing gamma rays at energies in an energy range from substantially 200 KeV to substantially 500 KeV where photoelectric absorption in uranium is significant and photoelectric absorption from other downhole elements is not significant, and the second band encompassing gamma rays at energies in an energy range greater than substantially 800 KeV where photoelectric absorption is not significant for any elements, including uranium, and

(b) forming a ratio of said measurements of intensities and comparing said ratio with a predetermined mathematical function to derive a quantitative indication of the uranium concentration present from said ratio of the measurements in the two energy bands and recording said quantitative indication as a function of the borehole depth of said measurement system.

4,698,500

METHOD AND APPARATUS FOR DETERMINING CLAY COUNTER-ION CONCENTRATION IN SHALY SANDS

Carl Scala, Mountain View, Calif., assignor to Halliburton Company, Duncan, Okla.

Filed May 31, 1985, Ser. No. 739,742

Int. Cl.[4] G01V *5/06*

U.S. Cl. 250—256 **4 Claims**

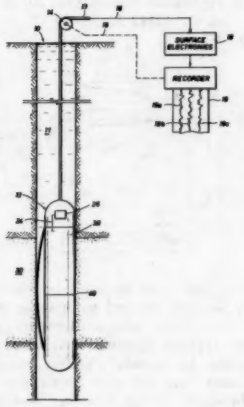
1. A method for determining, in situ, clay counter-ion concentrations in a fluid bearing shaly sand earth formation penetrated by a well borehole, comprising the steps of:

(a) detecting in a well borehole at a particular depth level natural gamma radiation emanating from the earth formations penetrated by the borehole as count rate signals and separating said detected gamma radiation signal into an energy spectrum of naturally occurring gamma radiation count rate signals as a function of energy and generating signals representative of said energy spectrum of said count rates of naturally occurring gamma radiation at said particular depth level;

(b) comparing said representative count rate signals with a plurality of standard gamma ray energy spectra representative of natural radioactive elements found in the earth formations penetrated by a well borehole and thereby separating out gamma ray count rates attributable to at least uranium U, thorium Th, and potassium K occurring in the earth formations;

(c) measuring the porosity ϕ of the earth formation at said particular depth level and normalizing the count rates attributable to uranium U and thorium Th at said particular depth level by forming a ratio of the sum of count rates attributable to uranium U and thorium Th divided by the porosity ϕ at said particular depth level, given by:

$$\text{Ratio} = \text{UTh}/\phi$$



(d) determining the clay counter ion concentration Q_v of the earth formations at said particular depth level by using a predetermined functional relationship relating the Ratio of step (c) to clay counter-ion concentration Q_v and obtaining a signal representative of Q_v at said particular depth level; and,

(e) recording said representative clay counter-ion concentration Q_v signal as a function of borehole depth.

4,698,501

SYSTEM FOR SIMULTANEOUS GAMMA-GAMMA FORMATION DENSITY LOGGING WHILE DRILLING

William C. Paske, Pearland, Tex., assignor to NL Industries, Inc., New York, N.Y.

Filed May 16, 1985, Ser. No. 734,963

Int. Cl.[4] G01V *5/12*

U.S. Cl. 250—265 **26 Claims**

1. A gamma radiation formation density logging apparatus for use in a borehole traversing an earth formation, comprising:

an elongated sonde having a longitudinal axis;

a source of gamma radiation located within said sonde;

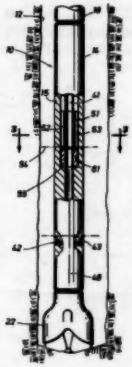
a gamma radiation detection assembly within said sonde, including a plurality of gamma radiation detectors, at least two of said detectors being sensitive to gamma rays resulting from Compton scattering, said at least two detectors being spaced the same distance in the same longitudinal direction from said radiation source along said sonde and also being located symmetrically about the longitudinal axis of said sonde;

means connected to each of said at least two gamma radiation detectors for producing first output signals from each of said at least two detectors;

means to provide an indication of the density of the fluid in said borehole; and

means responsive to the said first output signals from said

detectors and to said indication of said borehole fluid density for producing an additional output signal proportional to the density of the formation surrounding the borehole in the region of the sonde.



4,698,502

FIELD-EMISSION SCANNING AUGER ELECTRON MICROSCOPE

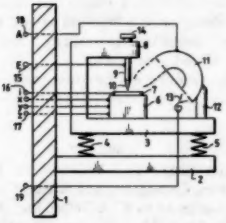
Johannes G. Bednorz, Adliswil; James K. Gimzewski, Zurich, and Bruno Reihl, Horgen, all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 24, 1986, Ser. No. 821,946

Claims priority, application European Pat. Off., Jan. 29, 1985, 85100892

Int. Cl.[4] G01N *23/00*; H01J *37/26*

U.S. Cl. 250—306 **5 Claims**



1. A field-emission scanning Auger electron microscope comprising:

a field-emission source;

a support for a specimen;

said support including scanning means for mutually displacing said field-emission source and said specimen;

an electron detector with associated electronic data processing circuitry, said electron detector being commonly supported with said specimen;

means for displaying and/or recording detected electrons,

said field-emission source comprising a sharply pointed tip having a radius at the apex no larger than about 100 nanometers, said tip being maintained at an essentially constant distance on the order of about 1 mm from the surface of said specimen, and

an electrical potential difference being maintained between said tip and said specimen.

4,698,503

FOCUSING APPARATUS USED IN A TRANSMISSION ELECTRON MICROSCOPE

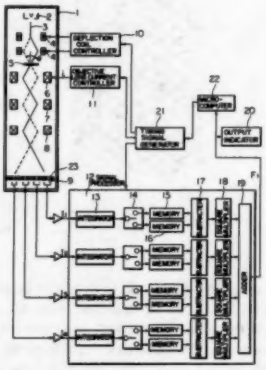
Setsuo Nomura, Tokyo; Morioki Kubozoe, and Shigeto Isakozawa, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 22, 1986, Ser. No. 821,454

Claims priority, application Japan, Jan. 23, 1985, 60-8975

Int. Cl.[4] H01J *37/26*

U.S. Cl. 250—311 **6 Claims**



1. A focusing apparatus used in a transmission electron microscope comprising:

electron lens means for imaging an electron beam which has transmitted through a specimen onto an imaging plane;

a plurality of electron beam sensors disposed on said imaging plane;

deflection means which deflects said electron beam by a predetermined angle for a short time length at least once in each of two directions in response to a change in the lens current of said electron lens means;

integration means which integrates output signals of said electron beam sensors for a predetermined time length at each deflected irradiation angle of electron beam;

memory means for storing separately integrated outputs produced by said integration means for each irradiation angle and for each of said electron beam sensors

arithmetic means which calculates the difference between integrated values stored in said memory means and derived from each electron beam sensor at two irradiation angles and sums up differences of integrated values derived from all electron beam sensors; and

lens current control means which controls the lens current of said electron lens means so that the summed output of said arithmetic means is a minimum value.

4,698,504

INSERTS ATTACHABLE TO A WIRE MESH BELT FOR SUPPORTING SHEETS IN A THERMOGRAPHY APPARATUS

Christopher K. Van Pelt, Nokomis, Fla., assignor to Thermo-O-Type Corporation, Nokomis, Fla.

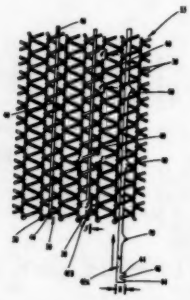
Filed Apr. 28, 1986, Ser. No. 856,401

Int. Cl.[4] G03C *5/16*

U.S. Cl. 250—319 **14 Claims**

1. A thermography apparatus comprising a wire mesh conveyor belt for conveying sheets successively through a powder zone, a heating zone, and a cooling zone, said powder zone comprising means for applying powdered thermographic resin to printed sides of the sheets and means for removing excess resin from the sheets, said heating zone including means for heating and melting the resin which is subsequently cooled in

said cooling zone, said wire mesh conveyor belt forming a series of lateral openings, and comprising a plurality of inserts mounted on said belt for supporting said sheets, said inserts each comprising an elongate strip, said strip including an edge integrally formed with a plurality of pointed projections spaced along a length of said strip and projecting in the direction of a height of said strip, said height being greater than a



width of said strip, to permit said insert to be inserted laterally into one of said openings in said belt with said projections thereof lying in the plane of said belt and then rotated 90° to a position wherein said projections extend beyond the plane of said belt to support the sheets, said insert including attachment means attachable to wire portions of said wire mesh belt to anchor said strip to said belt.

4,698,505

FINGER RING DOSIMETER

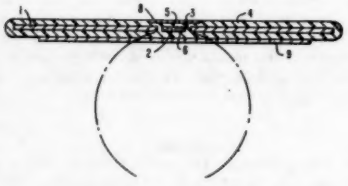
Hans-Norbert Brand, Munich, Fed. Rep. of Germany, assignor to Gesellschaft für Strahlen-und Umweltforschung m.b.H., Munich, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 844,621

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 8510060[U]

Int. Cl.[4] G01T *1/11*; H05B *33/00*

U.S. Cl. 250—337 **7 Claims**



1. A finger ring dosimeter comprising a clasp-like support structure formed as an open ring and having a central apex area, said support structure consisting of a thin elastic material which permits bending to adapt to a finger diameter as needed and having a cavity formed in said apex area, a radiation detecting material disposed in said cavity, and a carbonized foil disposed above said cavity on the side of said support structure remote from a wearer's finger, said clasp-like support structure and said radiation detecting material and said carbonized foil being embedded and hermetically enclosed in a coat of plastic material.

4,698,506

EMISSION COMPUTED TOMOGRAPHY APPARATUS

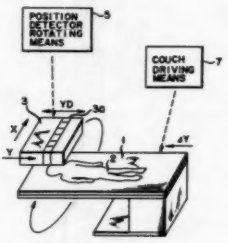
Yutaka Fujiki, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 28, 1986, Ser. No. 823,203

Claims priority, application Japan, Jan. 29, 1985, 60-13415

Int. Cl.[4] G01T *1/20*

U.S. Cl. 250—363 S **6 Claims**



1. An emission computed tomography apparatus for providing a tomogram image of a patient containing a dosage of radioisotope comprising:

a couch for supporting said patient;

a two-dimension detector for collecting data concerning the distribution of said radioisotope in said patient, said detector having an effectual visual field of length Y_D along the longitudinal axis of said couch;

means for rotating said detector about said longitudinal axis of said couch in a series of N incremental angular steps;

driving means for moving said detector relative to said longitudinal axis of said couch a given distance after each incremental angular step rotation of said detector, wherein the sum of said given distances for said N incremental angular steps is less than Y_D, whereby for each incremental angular step any given slice of said patient is interrogated by a different portion of said detector to thereby minimize the generation of artifacts by said detector;

position signal correction means for correcting said data from said detector as a function of said given distance of relative movement between said detector and said longitudinal axis of said couch; and

means for constructing a tomogram image of said patient in response to said corrected output data.

4,698,507

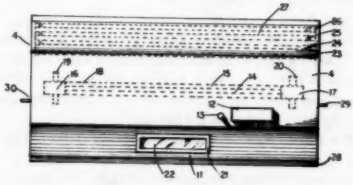
ENVIRONMENTAL EXPOSURE TESTER

Kenneth B. Tator, Coraopolis, and Richard O. Lackey, Mars, both of Pa., assignors to KTA-Tator, Inc., Pittsburgh, Pa.

Filed Sep. 26, 1986, Ser. No. 912,570

Int. Cl.[4] G01N *21/01, 25/00*

U.S. Cl. 250—429 **10 Claims**



1. Apparatus for testing samples of materials under controlled exposure conditions, said apparatus comprising:

a two part corrosion resistant chamber, said chamber having a tank base with a liquid seal perimeter well and said tank

base of said chamber adapted to contain an aqueous test liquid, and said chamber supplied with a moveable cover having mounted inside of said moveable cover an infrared radiant heating strip with a thermocouple extending beneath said radiant heating strip and with elongated fluorescent lamp tubes also mounted inside said cover and with said cover having a viewing port on said cover and with said cover possessing a gas inlet port at an end of said cover and a gas outlet port at opposite end of said cover;

a frame for mounting said tank base of said chamber and means for lifting said cover from said tank base;

a horizontal elongated, rotatable shaft mounted lengthwise within said tank base and enclosed by said moveable cover when said moveable cover rests on said liquid seal perimeter well of said tank base and with said elongated rotatable shaft having spokes extending outward from said shaft on which said spokes are attached mounts for holding test samples on said mounts and with said elongated rotatable shaft being rotated by a drive train from a motor with said motor having its speed controlled by an adjustable controller and with said motor having its "run" time controlled by an adjustable timer and with said motor having its "pause" time controlled by a separately adjustable timer;

means for energizing said fluorescent lamp tubes;

means for energizing said infrared heater strip and means to measure and set the temperature level beneath said infrared heater;

means to energize said drive motor and means to control speed of said drive motor;

means to control length of time said drive motor "runs" before "pausing";

means to control length of time said drive motor "pauses" before "running";

means to measure and set temperature level of test liquid of said tank base;

said mounting of said sample on said elongated rotatable shaft allowing exposure of said sample to immersion in a temperature controlled aqueous test liquid, heating and drying of said sample rotated out of said aqueous test liquid in a controlled atmosphere vapor space beneath temperature controlled infrared heating strip, irradiation of said sample by further rotation adjacent to said fluorescent lamp tubes, cooling said sample by further rotation to effect immersion in said aqueous test liquid with said controlled temperature, said rotation period being stopped for a "pause" before said rotation is resumed for a "run" period.

4,698,508

PHOSPHOR, RADIATION IMAGE RECORDING AND REPRODUCING METHOD AND RADIATION IMAGE STORAGE PANEL

Takashi Nakamura, and Kenji Takahashi, both of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Jul. 12, 1985, Ser. No. 754,424

Claims priority, application Japan, Jul. 13, 1984, 59-145385; Jul. 13, 1984, 59-145386

Int. Cl.[4] G01T *1/10*; C09K *11/467*

U.S. Cl. 250—484.1 **27 Claims**

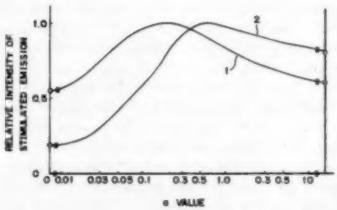
14. A radiation image recording and reproducing method comprising steps of:

(i) causing a divalent europium activated alkaline earth metal complex halide phosphor having the formula (I):

$$M^{II}FX.aM^{I}X'_2.bM^{II}X''_2:xEu^{2+} \quad (I)$$

in which each of M^{II} and M^{I} is at least one alkaline earth metal selected from the group consisting of Ba, Sr and Ca; each of X, X' and X" is at least one halogen selected from the group consisting of Cl, Br and I, and $X' \neq X''$; and a, b and x are numbers satisfying the conditions of $0.04 \leqq a \leqq 10.0$, $0.1 \leqq b \leqq 10.0$ and $0 < x \leqq 0.2$, respectively, to absorb a radiation having passed through an object or having radiated from an object;

(ii) exposing said stimulable phosphor to an electromagnetic



wave having a wavelength within the range of 450–1000 nm to release the radiation energy stored therein as light emission; and

(iii) detecting the emitted light.

4,698,509

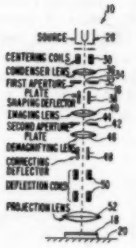
HIGH SPEED PATTERN GENERATOR FOR ELECTRON BEAM LITHOGRAPHY

William D. Wells, Ipswich; David M. Robinson, Wakefield; Richard M. DeLuca, Danvers, and Eric D. Burwen, Methuen, all of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 14, 1985, Ser. No. 701,711

Int. Cl.[4] G21K *5/04*

U.S. Cl. 250—492.2 **19 Claims**



1. Apparatus for controlling charged particle beam irradiation of a workpiece for high speed writing of a polygon represented by data specifying a polygon location, size and shape, said appratus comprising:

means for generating a charged particle beam having a rectangular cross-section, including means for varying the cross-section and position of said rectangular beam;

means for converting said polygon location data to deflection voltages for positioning said rectangular beam at said polygon location;

means for generating a ramp signal for sweep deflection of said rectangular beam over said polygon; and

means for converting said polygon size and shape data to shaping signals for dynamically varying the cross-section and position of said rectangular beam during sweep deflection in accordance with the size and shape of said polygon so that said beam uniformly irradiates an area of said workpiece having the location, size and shape of said polygon, said polygon being defined by a series of interconnecting segments which form an upper shape and a lower shape of said polygon, each of said segments being defined by segment data including segment length, slope height and step height, said means for converting said polygon data to shaping signals including means for con-

verting segment data to a line length signal for controlling the length of said rectangular beam and a line position signal for controlling the position of said rectangular beam during sweep deflection thereof, said means for converting said polygon data to shaping signals including

upper segment processor means for generating upper turn point locations for the segments in said upper shape relative to an initial position of said polygon, from said segment data,

upper shape generator means for generating an upper shape signal corresponding to the upper shape of said polygon, from said upper turn point locations, said segment lengths and slope heights,

lower segment processor means for generating lower turn point locations for the segments in said lower shape relative to the initial positive of said polygon, from said segment data,

lower shape generator means for generating a lower shape signal corresponding to the lower shape of said polygon, from said lower turn point locations, said segment lengths and slope heights, and

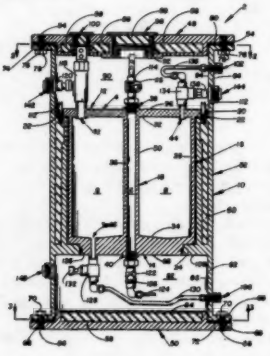
means for subtracting said upper shape signal and said lower shape signal to provide said line length signal, said line position signal corresponding to one of said upper shape signal and said lower shape signal.

4,698,510

MULTIPLE RESERVOIR TRANSPORTATION ASSEMBLY FOR RADIOACTIVE SUBSTANCES, AND RELATED METHOD

Wayne A. Handke, and Mark A. Priest, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jan. 29, 1986, Ser. No. 823,885
Int. Cl.[4] G21F *5/00*
U.S. Cl. 250—506.1 **14 Claims**



1. A container for transporting a radioactive substance, comprising:

a primary confinement receptacle having a first reservoir means for receiving the radioactive substance and a second reservoir means substantially surrounding said first reservoir means for receiving and maintaining another substance in said primary confinement receptacle in isolation from said radioactive substance; and

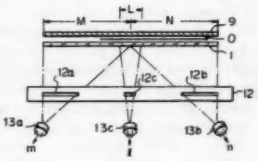
a secondary confinement receptacle having said primary confinement receptacle disposed therein.

4,698,511

DOCUMENT SHEET SIZE OR POSITION RECOGNITION DEVICE

Tetsuo Sueda, Chofu, and Toshinori Ando, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1985, Ser. No. 794,382
Claims priority, application Japan, Nov. 8, 1984, 59-235455; Dec. 28, 1984, 59-276477
Int. Cl.[4] G01N *21/86*
U.S. Cl. 250—560 **12 Claims**



1. A document sheet recognition device comprising:

a document sheet table for mounting a document sheet thereon;

a light source for illuminating the document sheet mounted on said document sheet table;

detecting means for detecting an average light quantity of each of fixed areas on said document sheet table; and

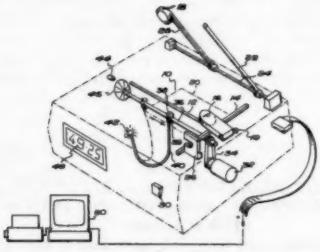
discriminating means for discriminating a size or position of the document sheet mounted on said document sheet table on the basis of merely the average light quantity of each fixed area detected by said detecting means.

4,698,512

LENGTH MEASURING APPARATUS

John Wilson, Pear Tree Farm, Kelfield, York, England

Filed May 22, 1985, Ser. No. 736,882
Int. Cl.[4] G01N *21/86*
U.S. Cl. 250—560 **8 Claims**



1. A label length measuring device comprising:

(a) a stationary datum support surface for supporting a label thereon in a stationary manner, said datum support surface having a portion thereof through which light can pass;

(b) an edge member fixed on the datum support surface against which one end of a label whose length is to be measured is placed;

(c) a light source located to one side of the datum support surface;

(d) means for moving the light source relative to the datum support surface so that in such movement a beam of light from the source passes through the datum support surface and traverses ends of and is interacted by the label placed on the datum support surface;

(e) photoelectric means located to the other side of the datum support surface in regions of said edge member and

an end of the label on the datum support surface remote from the edge member, for detecting when the beam of light is interrupted by respective label ends at said regions; and

(f) means for providing a signal representative of a distance between the label ends at said regions in reponse to said detection by the photoelectric means.

4,698,513

POSITION DETECTOR BY VIBRATING A LIGHT BEAM FOR AVERAGING THE REFLECTED LIGHT

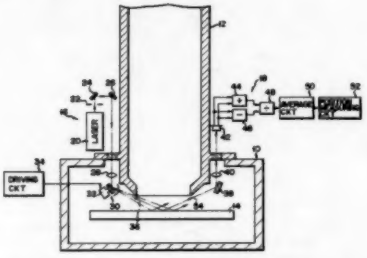
Toru Tojo, Kanagawa, and Mitsuo Tabata, Yokohama, both of Japan, assignors to Kabushiki Kaishi Toshiba, Kawasaki, Japan

Continuation of Ser. No. 789,086, Oct. 18, 1985, abandoned. This application Jan. 23, 1987, Ser. No. 9,628

Claims priority, application Japan, Mar. 15, 1985, 60-51707; Mar. 15, 1985, 60-51709

Int. Cl.⁴ G01N *21/86*

U.S. Cl. 250—561 **19 Claims**



1. A device for measuring the position of an object, comprising:

light beam radiation means for causing a light beam to be obliquely incident on a surface of the object;

first vibrating means for vibrating said light beam incident on the surface of the object to scan the same at a first frequency;

detecting means including photodetecting means for detecting a reflected light beam reflected from the surface of the object and generating a detection signal representing a position of the object; and

means for obtaining the position of the object in accordance with the detection signal, which includes a processing means for averaging the detection signal and calculating the position of the object.

4,698,514

METHOD AND AN ARRANGEMENT FOR THE DETECTION BY PHOTOELECTRIC MEANS OF MARKINGS MADE ON A TRAVELLING MATERIAL WEB PROVIDED WITH PRINTED DECORATION

Anders E. Hilmersson, Eksjögatan, and Istvan M. Ulvros, Baldersvägen, both of Sweden, assignors to Tetra Pak International AB, Lund, Sweden

Filed Jul. 6, 1984, Ser. No. 628,661

Claims priority, application Sweden, Jul. 6, 1983, 8303845

Int. Cl.⁴ B65H *25/24*

U.S. Cl. 250—566 **12 Claims**

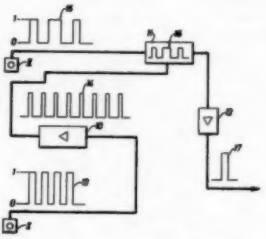
1. A method for controlling an operation on a moving patterned web in accordance with a first marking group and a second marking group provided on said patterned web, comprising the steps of:

producing a continuous output signal related to the web pattern adjacent a first detector means while said web is moved along a predetermined path,

creating a continuous stream of sampling pulses from the output of said first detector means,

producing a continuous output signal related to the web pattern adjacent a second detector means while said web is moved along said predetermined path,

sampling the output of said second detector means with a register means in response to said sampling pulses, said sampling pulses controlling times at which samples of said output of the second detector means are recorded in said register,



comparing a set of said samples of the output of said second detector with a reference pulse code corresponding to a set of stored values representative of a desired register means contents in order to determine whether the patterns passing adjacent said first detection means and said second detection means are said first marking group and said second marking group, respectively, and

generating a control signal for controlling operations on the moving web in response to said generated control signal when said set of samples in said register means corresponds to the set of stored values.

4,698,515

METHOD OF OPERATING RADIATION SENSORS

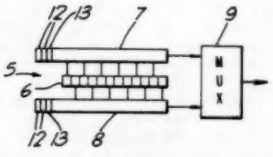
Dinyar Sepai, London, England, assignor to Crosfield Electronics (USA) Limited, London, England

Filed Mar. 10, 1986, Ser. No. 838,074

Claims priority, application United Kingdom, Mar. 8, 1985, 8506050

Int. Cl.⁴ H04N *5/335*

U.S. Cl. 250—578 **8 Claims**



1. A method of operating a radiation sensor having a plurality of radiation sensitive devices (6), a plurality of transfer buffers (7,8) associated with said radiation sensitive devices, and at least one isolation buffer (13) substantially identical with said transfer buffers but not associated with a radiation sensitive device, the method comprising the steps of:

(a) exposing said radiation sensor to radiation, whereby each radiation sensitive device stores a charge related to the total radiation incident thereon, and simultaneously sequentially reading out the contents of said transfer and isolation buffers at a regular rate;

(b) transferring said charge stored in said radiation sensitive devices into said corresponding transfer buffers; and,

(c) while exposing said sensor under substantially the same conditions as in step (a), sequentially reading out the contents of said transfer and isolation buffers at said same

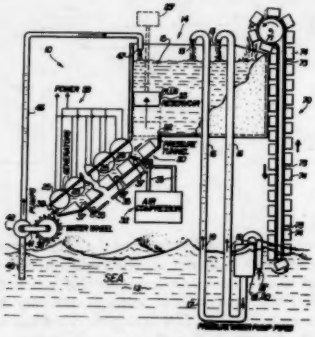
regular rate, and deriving a peripheral response correction factor from said contents of said at least one isolation buffer.

4,698,516

HYDRO-ELECTRIC POWER PLANT

Douglas A. Thompson, Brown's Plaza, Ocho Rios P.O., St. Ann, Jamaica

Filed Apr. 2, 1985, Ser. No. 719,093
Int. Cl.[4] F03B *13/00, 13/105*
U.S. Cl. 290—54 **8 Claims**



1. A hydro-electric power producing assembly of the type primarily designed to supply energy to a high capacity industrial facility, said assembly comprising:

(a) a structured reservoir disposed in communicating relation to a natural reservoir and dimensioned and configured to contain a predetermined minimum amount of water,

(b) supply means disposed in interconnecting relation between said structured reservoir and the natural reservoir and structured to transfer of water from the latter to the former, said supply means powered by an external power source,

(c) discharge means mounted on said structured reservoir for regulating discharge of liquid therefrom,

(d) a flow channel disposed adjacent said discharge means and in water receiving relation to said structural reservoir, said flow channel disposed to extend downwardly from said structural reservoir and structured to define a continuous gravity flow of water along the length thereof;

(e) a plurality of generator assemblies disposed successively along the length of said flow channel in driven engagement with said continuous gravity flow of water therealong, whereby continuous power is generated by said plurality of generators upon continuous discharge of water from said structured reservoir,

(f) air supply means including a source of pressurized air disposed in fluid communication with said flow channel means and structured for the supply of pressurized air into said gravity flow of water,

(g) said air supply means comprising a plurality of air inlets disposed in spaced relation to one another along the length of said flow channel, each of said inlets being structured to inject a flow of pressurized air into said continuous gravity flow of water along the length of said gravity flow of water,

(h) supplementary supply means including a pump assembly disposed in interruptive relation to an exiting water flow from said flow channel and structured to supply water from said natural reservoir to said structured reservoir during passage of said exiting water flow, whereby water is continuously supplied to and discharged from said structured reservoir,

(i) said supplementary supply means further including an externally powered conveyor means disposed in communicating relation with both said structured reservoir and said natural reservoir for transferring water from the latter to the former, and

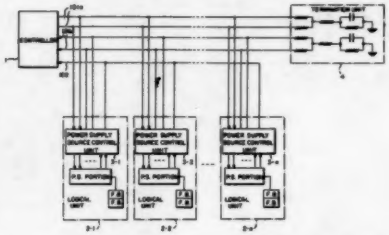
(j) a power take off means structured for channeling collectively produced power from said plurality of generators to a power user facility.

4,698,517

POWER SUPPLY SOURCE CONTROL SYSTEM

Hirokaza Tohya, and Tooru Kido, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Sep. 12, 1984, Ser. No. 649,683
Claims priority, application Japan, Sep. 13, 1983, 58-168708
Int. Cl.[4] H02J *9/00*
U.S. Cl. 307—43 **9 Claims**



1. A power supply source control system comprising:

a plurality of logical units, each of which includes:

electronic functional blocks,

a power supply source control means assigned with a specific address,

a first power supply source operation-controlled by said power supply source control means for supplying a first power source voltage to said electronic functional blocks,

a second power supply source for supplying a second power source voltage to said power supply source control means independently of said first power supply source, and

means for producing a signal indicative of a malfunction in at least one of said first and second power supply sources;

a system-power-supply-source controller for transmitting and receiving a plurality of data including address information to and from each said power supply source control means so that said first power supply source of each of said logical units is controlled and monitored;

at least one data signal line for transferring said data between said controller and all of said power supply source control means; and

an interruption line connected between said controller and all logical units to transmit said malfunction signal to said system-power-supply-source controller.

4,698,518

MAGNETICALLY SWITCHED POWER SUPPLY SYSTEM FOR LASERS

Thomas J. Pacala, LaCanada, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 727,931, Apr. 29, 1985, abandoned.
This application Feb. 12, 1987, Ser. No. 13,803
Int. Cl.[4] H01S *3/00*
U.S. Cl. 307—106 **19 Claims**

1. In a power supply system for providing energy necessary to avalanche ionize gas and subsequently the energy necessary to provide a sustained discharge of the gas after ionization thereof in an electric discharge gas laser having discharge electrodes in which a voltage necessary to avalanche ionize the

gas exceeds a sustained discharge voltage, the combination which comprises:

(a) a source of electrical energy;

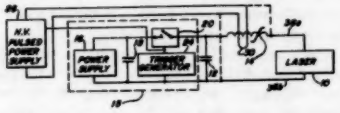
(b) a first energy storage device;

(c) means connected between the electrical energy source and the first energy storage device for periodically charging the first energy storage device;

(d) conductor means connected between the first energy storage device and the discharge electrodes of the laser;

(e) output saturable inductor switch means coupled to the conductor means and providing a high impedance to current flow through the conductor means when voltage across the first energy storage device is less than a predetermined level and a low impedance to current flow through the conductor means when the voltage across the first energy storage device reaches said predetermined level, the predetermined level being less than the avalanche ionization voltage and greater than the sustained discharge voltage; and

(f) avalanche ionization pulse-generating means coupled to said conductor means for supplying an avalanche ionization pulse to the discharge electrodes of the laser having a voltage sufficient to avalanche ionize the gas therein and in synchronism with the voltage level across the storage



device reaching said predetermined level, whereby the energy from the storage device will be discharged through the laser to provide a sustained discharge.

19. The method of providing excitation energy to an electric discharge gas laser having a pair of discharge electrodes comprising:

(a) periodically charging a primary storage device to a predetermined voltage level which is lower than that necessary to avalanche ionize the gas within the laser and higher than that necessary to produce a sustained discharge of the gas;

(b) periodically applying avalanche ionizing pulses directly to the laser discharge electrodes which have a voltage level sufficient to avalanche ionize the gas within the laser in synchronization with the voltage across the primary storage device reaching said predetermined level;

(c) connecting the primary storage device across the laser discharge electrodes with a magnetic switch in a saturable state when the voltage across the primary storage device reaches said predetermined level to produce a sustained discharge; and

(d) disconnecting the primary storage device from the laser discharge electrodes through the same magnetic switch in a non-saturable state at the termination of the sustained discharge.

4,698,519
MONOLITHICALLY INTEGRATABLE HIGH-EFFICIENCY CONTROL CIRCUIT FOR SWITCHING TRANSISTORS

Carlo Cini, Cornaredo; Claudio Diazzi, and Pietro Erratico, both of Milan, all of Italy, assignors to SGS Microelettronica SpA, Agrate Brianza, Italy

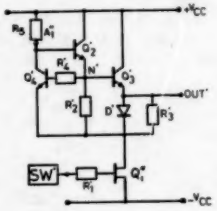
Filed Dec. 23, 1985, Ser. No. 812,935

Claims priority, application Italy, Dec. 28, 1984, 24275 A/84

Int. Cl.⁴ H03K *17/60, 3/33*

U.S. Cl. 307—254 **7 Claims**

1. A monolithically integratable control circuit for the switching of transistors, comprising a first, a second and a third transistor, each having a first terminal, a second terminal, and a control terminal, said control terminal of said first transistor being connected to a source of switching signals, said control terminal of said second transistor being connected to a first terminal of a supply voltage generator by means of a current generator, and said control terminal of said third transistor being connected to said first terminal of the second trnasistor, said second terminal of said second transistor and said second terminal of said third transistor both being connected to said first terminal of said supply voltage generator, said second terminal of said first transistor being connected to said first terminal of said third transistor by a resistive element, said first



terminal of said third transistor forming an output terminal of the circuit, said first terminal of said first transistor being connected to a second terminal of said supply voltage generator; said circuit further comprising a fourth transistor, having a first terminal, a second terminal and a control terminal which are respectively connected to said second terminal of said first transistor and to said control terminal of said second transistor and, through a first resistor, to said control terminal of said third transistor, said second terminal of said first transistor being connected to said control terminal of said third transistor through a second resistor.

4,698,520
METHOD AND APPARATUS TO TRIGGER THE CURRENT-CONDUCTING STATE OF GATE-TURN-OFF THYRISTOR

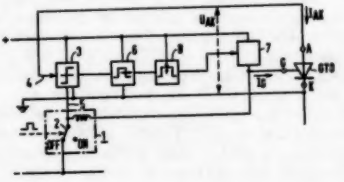
Joerg-Michael Peppel, Koenigstein, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 15, 1985, Ser. No. 702,036

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1984, 3405769

Int. Cl.⁴ H03K *17/72*

U.S. Cl. 307—633 **7 Claims**



1. A method for triggering and maintaining a current-conducting state of a gate-turn-off thyristor, comprising the steps of:

detecting a voltage drop between the anode and cathode of a gate-turn-off thyristor; then

initiating an ignition current pulse of pre-determined magnitude to the gate of the gate-turn-off thyristor whenever a preset threshold voltage is attained by said detected voltage drop; then

terminating the ignition current pulse after a pre-determined time, that pre-determined time being independent of the

further continuation of said detected voltage drop after the initiation of said ignition current pulse,

said ignition current pulse magnitude and duration being pre-determined as a function of a time period since a previous ignition current pulse.

4,698,521

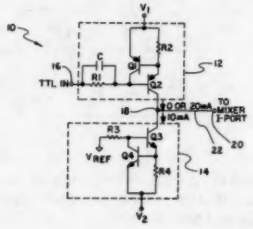
BI-DIRECTIONAL CURRENT SWITCH

James E. Beasley, Chatsworth, and Steven M. Lindsey, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 24, 1986, Ser. No. 832,210

Int. Cl.[4] H03K *3/01, 17/60*

U.S. Cl. 307—270 **10 Claims**



1. A bi-directional current switch having an input terminal, an output terminal and first and second power supply terminals for driving a load coupled to said output terminal in response to an input signal applied to said input terminal, said current switch comprising:

a first transistor having a first electrode connected to a first power supply, a second electrode connected to a first electrode of a second transistor and a third electrode connected to the second electrode of said second transistor, said second transistor having a third electrode connected to a node, said node connected to said output terminal by an output path;

first input means for coupling a first input terminal to the second electrode of said second transistor;

first output means connected between said first power supply and the first electrode of said second transistor for setting a first level of current flow between the third electrode of said second transistor and said output node;

a third transistor having a third electrode connected to said node, a second electrode connected the third electrode of a fourth transistor, and a first electrode connected to a second electrode of said fourth transistor, said fourth transistor having a first electrode connected to a second power supply;

second input means for coupling a second input signal to the second electrode of said third transistor; and

second output means connected between said second power supply and the first electrode of said third transistor for setting the level of current flow between the third electrode of said third transistor and said node.

4,698,522

STRUCTURE FOR HALL DEVICE FOR COMPENSATION OF FIRST AND SECOND ORDER VOLTAGE OFFSETS

James W. Larsen, Douglasville, and Daniel P. Campbell, Atlanta, both of Ga., assignors to Sangamo Weston, Inc., Norcross, Ga.

Filed Nov. 21, 1986, Ser. No. 933,444

Int. Cl.[4] H03K *17/90;* **H01L** *43/00;* **G01R** *33/06;* **H03H** *1/00*

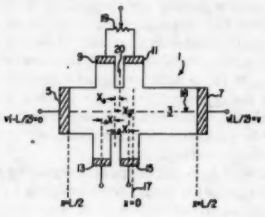
U.S. Cl. 307—309 **14 Claims**

1. A structure for a Hall device comprising:

a main body formed from a material exhibiting the Hall effect;

at least a pair of excitation electrodes disposed on opposing portions of the main body for receiving an excitation voltage or current; and

Hall voltage output electrodes comprising at least a first pair of output electrodes disposed along one of the remaining sides of the main body, said output electrodes being equally spaced from a line drawn between the output



electrodes and transverse to a line drawn through the excitation electrodes, and at least one additional output electrode disposed on a portion of the main body opposite the first pair of output electrodes,

wherein at least said first pair of output electrodes are arranged such that said line drawn between the pair is offset from a centerline drawn transverse to the line between the excitation electrodes and through the electrical midpoint of the main body.

4,698,523

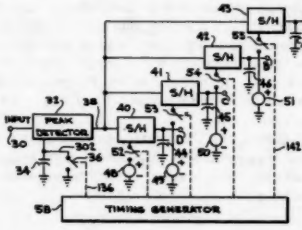
SERVO DATA DEMODULATOR

Eugen Gershon, Los Gatos, and Rudolph J. Sterner, Cupertino, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Nov. 1, 1985, Ser. No. 794,943

Int. Cl.[4] H03K *5/15, 5/153;* **G11C** *27/02*

U.S. Cl. 307—351 **19 Claims**



1. An apparatus for sampling an input signal at different times for purpose of comparison of the magnitude of the signal at at least some of said different times comprising:

a single means for detecting the peak amplitude of said signal at each of said different times; and

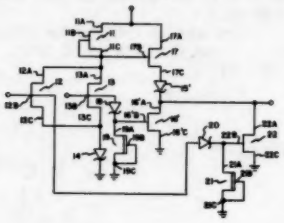
plural means coupled to said single means for peak detecting for sampling and holding the peak voltages detected where each said means for sampling and holding samples the detected peak voltage at a corresponding one of said different times for purposes of comparison of the peak voltages detected during said at least some of said different times.

4,698,524

MESFET LOGIC USING INTEGRAL DIODE LEVEL SHIFTING

Mark R. Plagens, Richardson, Tex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 16, 1986, Ser. No. 886,596
Int. Cl.[4] H03K *19/094, 19/092, 19/02*
U.S. Cl. 307—450 **7 Claims**



1. A semiconductor logic circuit comprising:

a first field effect transistor means having a drain terminal means, a gate terminal means, and a source terminal means, said first field effect transistor means drain terminal means being for electrical connection to a first voltage source and said first field effect transistor means gate terminal means being electrically connected to said first field effect transistor means source terminal means;

a second field effect transistor means having a drain terminal means, a gate terminal means, and a source terminal means, said second field effect transistor means drain terminal means being electrically connected to said first field effect transistor means source terminal means and said second field effect transistor means gate terminal means being for receiving input signals;

a first threshold device means having first and second terminal means between which current substantially flows only if any voltage occurring therebetween exceeds a threshold, said first threshold device means first terminal means being electrically connected to said second field effect transistor means source terminal means, said first threshold device means second terminal means being for electrical connection to a second voltage source;

a third field effect transistor means having a drain terminal means, a gate terminal means, and a source terminal means, said third field effect transistor means drain terminal means being for electrical connection to a third voltage source and said third field effect transistor means gate terminal means being electrically connected to said first field effect transistor means source terminal means;

a second threshold device means having first and second terminal means between which current substantially flows only if any voltage occurring therebetween exceeds a threshold, said second threshold device means first terminal means being electrically connected to said third field effect transistor means source means, said second threshold device means second terminal means being for providing output signals;

a fourth field effect transistor means having a drain terminal means, a gate terminal means, and a source terminal means, said fourth field effect transistor means drain terminal means being electrically connected to said second threshold device means second terminal means, said fourth field effect transistor means source terminal means being for electrical connection to a fourth voltage source;

a third threshold device means having first and second terminal means between which current substantially flows only if any voltage occurring therebetween exceeds a threshold, said third threshold device means first terminal means being electrically connected to said second field effect transistor means gate terminal means, and said third threshold device means second terminal means being electrically connected to said fourth field effect transistor means gate terminal means; and

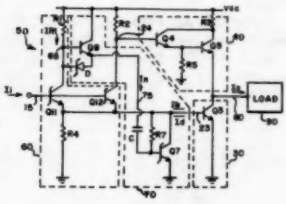
a fifth field effect transistor means having a drain terminal means, a gate terminal means, and a source terminal means, said fifth field effect transistor means drain terminal means being electrically connected to said fourth field effect transistor means gate terminal means, said fifth field effect transistor means source terminal means being for electrical connection to a fifth voltage source, and said fifth field effect transistor means gate terminal means being electrically connected to said fifth field effect transistor means source terminal means.

4,698,525

BUFFERED MILLER CURRENT COMPENSATING CIRCUIT

Danesh Tavana, San Jose, and Sing Y. Wong, Sunnyvale, both of Calif., assignors to Monolithic Memories, Inc., Santa Clara, Calif.

Filed Dec. 3, 1985, Ser. No. 804,192
Int. Cl.[4] H03K *19/080, 19/003, 3/33*
U.S. Cl. 307—456 **5 Claims**



1. In an inverting output buffer circuit including an input terminal, an output terminal, a power supply terminal, a ground terminal, an input signal phase splitter stage having a sink control node and a source control node, at which said phase splitter stage causes sink and source control currents, in-phase and 180° out-of-phase, respectively with input signal currents, a source stage responsive to a high source control signal to conduct current from the power supply terminal to the output terminal, and a sink stage including a sink transistor responsive to a high sink control signal to conduct current from the output terminal to the ground terminal, the improvement comprising a Miller current compensating circuit comprising:

a chargeable and dischargeable Miller compensator control node connected to the power supply terminal;

a shunt transistor having a collector connected to the sink control node, an emitter connected to the ground terminal, and a base; and

means including a capacitor coupling the base of the shunt transistor to the Miller compensator control node.

4,698,526

SOURCE FOLLOWER CMOS INPUT BUFFER

James D. Allan, Colorado Springs, Colo., assignor to Inmos Corporation, Colorado Springs, Colo.

Filed Oct. 17, 1985, Ser. No. 788,442
Int. Cl.[4] H03K *19/094, 19/092, 17/687, 17/10*
U.S. Cl. 307—475 **20 Claims**

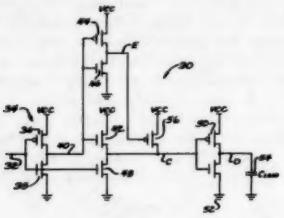
1. A CMOS input buffer circuit comprising:

a CMOS inverter input stage including an input for receiving a TTL signal;

a CMOS inverter output stage including an input and an output; and

an n-channel field effect transistor coupled as a source follower to said input stage and coupled to drive said output

stage said output stage not being driven directly by said TTL signal, wherein said buffer circuit receives TTL signals and converts them to CMOS levels provided at said output of said output stage.



4,698,527

TTL-ECL LEVEL CONVERTER OPERABLE WITH SMALL TIME DELAY BY CONTROLLING SATURATION

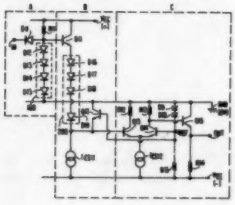
Kouji Matsumoto, Toyko, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 31, 1986, Ser. No. 925,577

Claims priority, application Japan, Oct. 31, 1985, 60-245404

Int. Cl.[4] H03K *19/013, 19/086, 19/092*

U.S. Cl. 307—475 **11 Claims**



1. A signal level converter comprising:

a positive power supply line;

a grounding line;

a negative power supply line;

an input terminal receiving an input signal, said input signal having low and high logic levels;

an input diode connected to said input terminal at a cathode and having an anode;

an input transistor having a collector connected to said positive power supply line, a base connected to said anode of said input diode and an emitter;

a first series connection of diodes between said anode of said input diode and said grounding line, said diodes in said first series connection being forward-biased when said input signal is at said high logic level;

a second series connection of diodes coupled at one end to said emitter of said input transistor and having an other end;

a current source connected between said other end of said second series connection and said grounding line, said diodes in said second series connection being forward-biased when said input signal is at said high logic level;

a voltage source generating a reference voltage;

a clamping transistor having a collector connected to said grounding line, a base receiving said reference voltage and an emitter connected to said other end of said second series connection; and

a comparing means for comparing a voltage at said other end of said second series connection with said reference voltage, said comparing means being energized by a power voltage between said negative power supply line and said grounding line, and producing an output signal as a result of comparison.

4,698,528

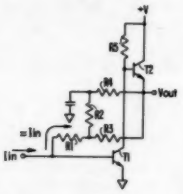
EDGE DETECTION USING DUAL TRANS-IMPEDANCE AMPLIFIER

Wendell P. Marple, and Hubert A. Miller, both of Manassas, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 22, 1985, Ser. No. 768,289

Int. Cl.[4] G01R *19/12, 29/02*

U.S. Cl. 307—517 **5 Claims**



1. An edge detection circuit comprising:

a first switching means having a control input connected to an input signal source, with its principal current conducting path connected between a first reference potential and a first node;

a second switching means having its control input connected to said first node and its principal current conducting path connected between a second reference potential and an output node;

a feedback filter means having a first terminal connected to said output node and a second terminal connected to an input node;

said feedback filter means operating on positive going pulse signals input to said input node to differentiate said input signals into a negative differentiated pulse and a positive differentiated pulse forming a differentiated signal;

said feedback filter means acting on said negative differentiated pulse so that its downward excursion has a greater amplitude than its following upward excursion and on said positive differentiated pulse so that its upward excursion has a greater amplitude than its following downward excursion;

whereby noise signals superimposed upon said differentiated signal waveform will be of lesser amplitude than a positive going differentiated pulse following said negative going differentiated pulse.

4,698,529

OUTPUT CONTROL CIRCUIT TO PREVENT OUTPUT OF INITIAL SPIKE NOISE

Fumitaka Asami, Kunitachi, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed May 20, 1985, Ser. No. 736,029

Claims priority, application Japan, May 30, 1984, 59-108529

Int. Cl.[4] H03B *1/04;* **H03K** *5/00, 5/13*

U.S. Cl. 307—542 **9 Claims**

1. An output control circuit for an IC device for clamping an input terminal of an output circuit of said IC to prevent the output of an initial noise spike appearing at the starting time when a supply voltage is building up in the IC device, said output control circuit comprising:

an input terminal for receiving an input signal;

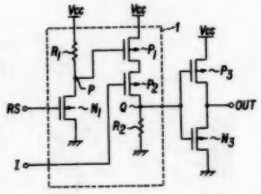
an output terminal for providing an output;

first and second voltage supply lines for providing said supply voltage;

a first resistive element having a first end connnected to said first voltage supply line and a second end connected to a first junction point;

a first transistor, connected between said first junction point and said second voltage supply line, said transistor having a gate for receiving a reset signal, said first transistor further being turned off in response to said reset signal;

second and third transistors connected in series between said first voltage supply line and a second junction point operatively connected to said output terminal, said second



transistor having a gate connected to said first junction point such that said second transistor is turned off when the reset signal is applied to the gate of said first transistor, said third transistor having a gate connected to said input terminal for receiving the input signal; and

a second resistive element connected between said second junction point and said second voltage supply line.

4,698,530

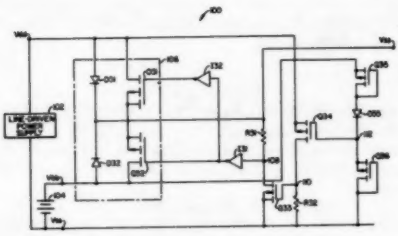
POWER SWITCH FOR DUAL POWER SUPPLY CIRCUIT

Peter K. Thomson, Ralston Paisley, Scotland, assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Nov. 9, 1984, Ser. No. 669,930

Int. Cl.[4] H03K *17/56, 17/687*

U.S. Cl. 307—571 **3 Claims**



1. A power switching circuit for selectively connecting first and second input voltage terminals to an output voltage terminal, wherein a first input voltage exists between said first input voltage terminal and a reference terminal and a second input voltage exists between said second input voltage terminal and said reference terminal, said circuit comprising:

first and second transistors, said first transistor being coupled to connect said first input voltage terminal to said output voltage terminal and having a gate terminal, said second transistor being coupled to connect said second input voltage terminal to said output voltage terminal and having a gate terminal; and

switching means coupled to respond to the voltage at said first input voltage terminal for controlling the conduction in said first and second transistors, said switching means being operable for turning said first transistor on and said second transistor off when the magnitude of said first input voltage exceeds a predetermined value and for turning said first transistor off and said second transistor on when the magnitude of said first input voltage does not exceed said predetermined value, and including first and second inverters, said first inverter having an output terminal coupled to said gate of said second transistor said second inverter having an input terminal coupled to said output terminal of said first inverter and having an output terminal coupled to said gate terminal of said first transistor, said first inverter also having an input terminal coupled to said output voltage terminal through first resistor means and coupled to said reference terminal through a third transistor, said third transistor having a gate terminal coupled to said reference terminal through second resistor means and coupled to said first voltage input terminal through a fourth transistor, said fourth transistor having a gate terminal with a reference voltage applied thereto and operable for switching off when the magnitude of said input voltage does not exceed said predetermined value.

4,698,531

POWER-ON RESET CIRCUIT

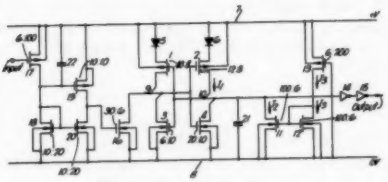
Keith L. Jones, Middlesex, England, assignor to The General Electric Company, p.l.c., England

Filed Jul. 15, 1986, Ser. No. 885,861

Claims priority, application United Kingdom, Jul. 24, 1985, 8518692

Int. Cl.[4] H03K *5/13, 3/26;* **H03F** *3/04*

U.S. Cl. 307—592 **4 Claims**



1. An integrated circuit having first and second power supply conductors for energizing said integrated circuit, and a power-on reset circuit arrangement, comprising:

a bistable circuit including a first output node, a first active device and means connecting said first active device between said first power supply conductor and said first output node, and

a current mirror circuit including a second active device and means connecting said second active device between said first output node of said bistable circuit and said second power supply conductor,

wherein the currents which flow in said first and second active devices between said first and second power supply conductors as the potential difference between said supply conductors rises from a zero value are such that the potential at said first output node is held essentially at that of said second power supply conductor, for utilization as a resetting signal potential until said potential difference exceeds a predetermined value.

4,698,532

ELECTROMAGNETIC PROJECTILE LAUNCHER WITH EXPLOSIVE-START AND PLASMA DRIVE

David P. Ross, Center Township, Beaver County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 399,509, Jul. 19, 1982, abandoned. This application Oct. 9, 1984, Ser. No. 659,029

Int. Cl.[4] H02K *41/00*

U.S. Cl. 310—12 **5 Claims**

1. An electromagnetic projectile launcher comprising:

a pair of generally conductive rails;

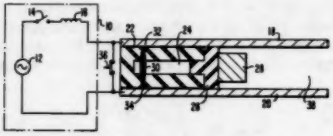
a source of current connected to said rails;

an insulating cartridge disposed between said rails, said cartridge having a pressure chamber, and an aperture for receiving a projectile wherein said aperture is sized to provide for an interference fit between said cartridge and said projectile;

a fuse element within said pressure chamber;

means for electrically connecting said fuse element between said rails;

means for commutating current at a preselected magnitude from said current source to said rails such that the commutated current initially passes through said fuse element causing it to explode, thereby creating a plasma within said pressure chamber, said plasma having sufficient pressure to produce initial movement of said projectile between said rails, and said plasma subsequently serving as a means for conducting said preselected magnitude of commutated current between the rails and for propelling the projectile along the rails; and



a portion of each of said rails, extending from said projectile to said means for electrically connecting said fuse, being lined by said insulating cartridge thereby preventing contact between said portion and said plasma. –.

4,698,533

CONNECTION INSULATOR AND STATOR ASSEMBLY

Alan L. Kindig, Hoiland, Mich., and Ho H. Tew, Grove Crescent, Singapore, assignors to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 617,177, Jun. 4, 1984, Pat. No. 4,602,424.
This application Jul. 18, 1986, Ser. No. 886,709
Int. Cl.[4] H02K *11/00*
U.S. Cl. 310—71 **25 Claims**

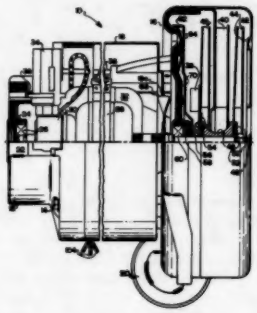
1. A connection insulator of a heat shrinkable electrical insulating material for use in a dynamoelectric machine including a magnetic core and at least one winding arranged thereon having a plurality of coils of wire conductors with end turns thereof projecting beyond end faces of the cores and with lead wires extending from at least one of the end turns of the coils, and an electrical connection joining at least one of the lead wires with at least another wire, the connection insulator comprising: a tubular portion with an open end adapted to receive the electrical connection and a part of the at least one wire and the another wire and with a closed end adapted to be disposed at least adjacent the electrical connection, an integral flat tab portion extending axially from said closed end at a junction with said tubular portion, and surfaces on said flat tab portion with a plurality of ridges in said surfaces, a substantial part of said ridges in said surfaces of said flat tab portion spaced from said junction adapted to be grippingly engaged by the at least one end turns of one of the coils and a substantial part of said tubular portion spaced from said junction adapted to be grippingly engaged by the at least one end turns of an adjoining coil, and the parts of said tubular portion and said flat tab portion not engaged by the at least one end turns of the one and adjoining coils being adapted to span a space therebetween.

4,698,534

QUIET BY-PASS VACUUM MOTOR

Francis E. Smith, Chagrin Falls; Robert L. Hyatt, Tallmadge, and Leonard J. Kline, Jr., Ravenna, all of Ohio, assignors to Ametek, Inc., Kent, Ohio

Division of Ser. No. 704,321, Feb. 22, 1985, Pat. No. 4,621,991.
This application Jul. 21, 1986, Ser. No. 887,381
Int. Cl.[4] H02K *5/00*
U.S. Cl. 310—89 **10 Claims**



1. A motor assembly, comprising:

a shaft;

a commutator maintained upon said shaft; and

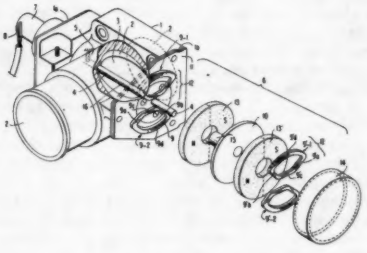
a commutator end bracket housing said commutator and having a recess in one end thereof, said recess receiving said shaft in electrically conducting engagement with grounding means secured to the commutator end bracket for electrically grounding said shaft, said grounding means comprising an electrically conductive disk received within said recess and a U-shaped clip, said conductive disk positioned at one end of said clip, said clip fitting over said cylindrical wall.

4,698,535

ELECTRIC MOTOR OPERATED THROTTLE VALVE

Manabu Shiraki, Yamato; Hiroyuki Amano, Kariya; Tomoaki Nishimura, and Katsumasa Shimizu, both of Toyoake, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Apr. 3, 1986, Ser. No. 847,789
Claims priority, application Japan, Apr. 4, 1985, 60-50284[U]
Int. Cl.[4] H02K *21/14*; F02D *11/10*; B60K *31/04*
U.S. Cl. 310—156 **4 Claims**



1. An electric motor operated throttle valve for an internal combustion engine comprising:

a throttle valve (3) rotatably supported by a shaft (4), said valve disposed within air passage means (2) of an internal combustion engine and adapted to open and close the air passage, return spring means (5) urging said throttle valve

to close the air passage means, and an electric motor connected operatively to said shaft to rotate said throttle valve in a direction which causes the air passage to open, said motor comprising;

a rotatable shaft (15) integral with a rotor yoke (10), coaxial with and coupled directly to said shaft supporting said throttle valve;

field magnetic means (13, 13') comprising at least one field magnet having one pair of N and S poles attached to said rotor yoke and axially aligned with said rotatable shaft; and

stator armature means (12, 12') including two pairs of conductor windings disposed on opposite sides of said field magnetic means, each said pair of windings comprising a set of two conductor windings spaced apart from one another and face-to-face with said field magnetic means, said conductor windings each having conductor portions with an included angle greater than 90° and less than 180°, wherein said conductor windings are positioned relative to said N and S poles of said field magnet means so that when said windings are excited any conductor portions thereof can work effectively to develop torque to said motor.

4,698,536

BUILT-IN WHEEL SPEED SENSOR STRUCTURE FOR A CAR

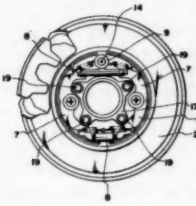
Harumi Oohori, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Apr. 16, 1986, Ser. No. 852,759

Claims priority, application Japan, Apr. 16, 1985, 60-055535[U]

Int. Cl.⁴ H02K *17/42*

U.S. Cl. 310—168 **4 Claims**



1. A built-in wheel speed sensor structure for a vehicle, comprising:

(a) an internal gear-like sensor rotor fixed to wheel means, said wheel means rotating integrally with a tire; and

(b) an electromagnetic wheel speed sensor fitted to a fixed portion of a parking brake means, said wheel speed sensor being disposed in an anchor pin on a bearing case, said wheel speed sensor fixed in such a manner as to face said sensor rotor, and wherein said sensor rotor and said wheel speed sensor are disposed inside a brake drum of said parking brake means.

4,698,537

ELECTRICAL DRIVE SYSTEMS INCORPORATING VARIABLE RELUCTANCE MOTORS

John V. Byrne, Dublin, and Jeremiah B. O'Dwyer, Kildare, both of Ireland, assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

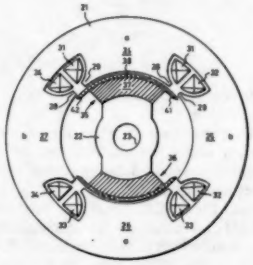
Filed Jan. 7, 1986, Ser. No. 816,867

Claims priority, application Ireland, Jan. 15, 1985, 93/85

Int. Cl.⁴ H02K *17/12*

U.S. Cl. 310—168 **13 Claims**

1. A two-phase variable reluctance motor, comprising a stationary or driving member having a plurality of salient driving poles, the number of said poles being four or a multiple of four, a magnetizing winding for each driving pole, each said magnetizing winding being either a first phase winding or a second phase winding and alternate driving poles having windings of different phases so that the driving poles neighboring each driving pole carrying a first phase winding each carry a winding of the second phase and the driving poles neighboring each pole carrying a second phase winding each carry a winding of the first phase, and a movable or driven member having a plurality of movable or driven poles, the number of said driven poles being one-half of the number of driving poles, each driving poles having a poleface region, the extent of which in the direction of relative displacement of said driving and driven poles approaches the driving pole pitch, so that each poletip portion of each driving pole is disposed at a spacing in said direction of relative displacement of said driving and driven poles from a poletip portion of an adjacent driving pole, the minimum said spacing of said poletip portions being relatively short compared with the extent of the driving pole poleface regions in said direction of relative displacement, each driven pole having poletip portions of relatively high magnetic



permeability and a saturating zone, said saturating zone extending over substantially the full extent of the pole in said direction of relative displacement and defining a constriction in the path presented to magnetic flux in operation of the motor, so that the greater part of the magnetomotive force produced by energization of a driving member magnetizing winding may be developed across said saturating zone, and each driven pole having a poleface region, the extent of which in said direction of relative displacement is related to that of the driving pole poleface regions, so that each poletip portion of a driven pole which is in alignment with a driving pole is disposed in the vicinity of both a poletip portion of said aligned driving pole and the poletip portion spaced therefrom of a driving pole neighboring said aligned driving pole, for the passage of fringing flux through said poletip portions of the driven pole on simultaneous excitation of said first and second phases, said fringing flux being relatively strong for the driven poletip portion in the vicinity of the poletip portions of driving poles of opposite polarity and being relatively weak for the driven poletip portion in the vicinity of the poletip portions of driving poles of the same polarity.

4,698,538

DC BRUSHLESS ELECTROMAGNETIC ROTARY MACHINE

Makoto Yoshida, Machida, Japan, assignor to Aupac Co., Ltd., Tokyo, Japan

Filed Jun. 5, 1986, Ser. No. 870,966

Claims priority, application Japan, Jun. 5, 1985, 60-121737

Int. Cl.⁴ H02K *3/00*

U.S. Cl. 310—179 **10 Claims**

1. A dc electromagnetic rotary machine comprising:

permanent magnet means having a generally circular shape for producing magnetic flux, said permanent magnet means having a first surface portion magnetized in a first magnetic polarity and a second surface portion magne-

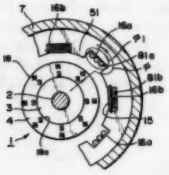
tized in a second magnetic polarity opposite to the first magnetic polarity;

rotor shaft means for fixedly carrying said permanent magnet means thereon;

casing means including a magnetically permeable substance for movably supporting said rotor shaft means;

armature core means having a generally annular shape and fixedly supported by said casing means so as to face substantially the first surface portion of said permanent magnet means for permeating the magnetic flux therethrough;

coil means supported by said armature core means for conducting current therethrough, said coil means facing substantially the first surface portion of said permanent magnet means, said coil means including alternating first and



second coil portions conducting current in substantially opposed directions;

magnetic-path forming means extending from said casing means toward said rotor shaft means for bridging the magnetic flux between said casing means and said permanent magnet means; and

shielding means for shielding only at least one said first portion of said coil means wherein current is conducted in said first portion which induces magnetic flux in a direction opposite to that of the magnetic flux generated from said permanent magnet means,

said current flowing through said second coil portions causing the magnetic flux emanating from said permanent magnet means to be turned partially.

4,698,539

DYNAMOELECTRIC MACHINES

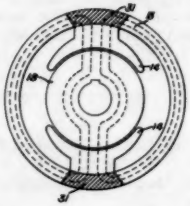
John Workman, Lough House, Greyabbey, Northern Ireland

Continuation-in-part of Ser. No. 77,281, Sep. 20, 1979, abandoned, which is a continuation of Ser. No. 803,941, Jun. 6, 1977, abandoned. This application Oct. 7, 1981, Ser. No. 309,373

Claims priority, application United Kingdom, Jun. 10, 1976, 24009/76

Int. Cl.[4] H02K *1/00*

U.S. Cl. 310—216 **2 Claims**



1. An electric motor comprising;

(a) rotor having a rotor shaft;

(b) a stator, said stator comprising an annularly shaped yoke having an opening therethrough for receiving said rotor, said yoke consisting of a continuous metal strip wound in a spiral coil having consecutive convolutions, an adhesive having electrically insulating properties and disposed within said convolutions of said coil to form an electrical path for the conduction of magnetic flux and a mechanically self-supporting structure, and a plurality of pole assemblies secured to said self-supporting structure to extend into said opening; and

(c) at least one end member, said one end member being supported by said self-supporting structure at an end of said yoke for mounting a bearing for rotatively receiving said rotor shaft.

4,698,540

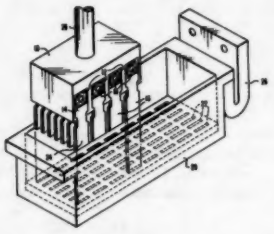
BRUSH ASSEMBLY FOR A HOMOPOLAR GENERATOR

Bobby D. McKee, San Jose, Calif., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1986, Ser. No. 912,735

Int. Cl.[4] H02K *13/00*

U.S. Cl. 310—239 **5 Claims**



1. A brush assembly for use in a dynamoelectric machine comprising:

a plurality of contact elements;

a brush holder having a plurality of slots for receiving a first portion of each of said contact elememnts;

a plurality of resilient tubular members, one of said tubular members extending longitudinally within each of said slots and lying adjacent to a bottom of each of said slots;

means for retaining said first portion of each of said contact elements within said brush holder slots;

a brush box having an array of openings for receiving a second portion of each of said contact elements; and

means for moving said brush holder with respect to said brush box thereby causing a first end of each of said contact elements to make sliding contact with a rotating member and causing each of said resilient tubular members to be radially compressed between a second end of each of said contact elements and one of said slot bottoms.

4,698,541

BROAD BAND ACOUSTIC TRANSDUCER

Yoseph Bar-Cohen, Seal Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Jul. 15, 1985, Ser. No. 755,009

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—326 **7 Claims**

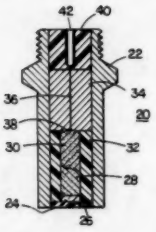
1. A broad band accoustic transducer comprising,

(a) a piezoelectric crystal having conductive plating on two sides;

(b) a first dampening backing layer consisting of tugsten, copper, and indium 50-lead 50 metallurgically bonded to one side of the crystal having an impedance matching the acoustic impedance of the crystal; and

(c) a second dampening and attenuation backing layer consisting of tungsten, copper, indium 50-lead 50, and diallyl

phthalate metallurigically bonded to the first dampening layer having an impedance matching the acoustic impedance of the first layer and having a very high attenuation factor.



4,698,542

BRUSHLESS DIRECT CURRENT MOTOR SYSTEM

Rolf Muller, St. Georgen, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co. K.G., St. Georgen, Fed. Rep. of Germany

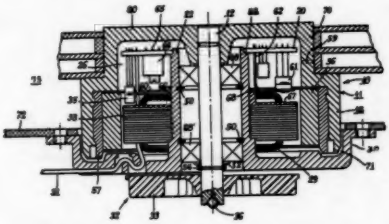
Continuation of Ser. No. 581,337, Feb. 17, 1984, Pat. No. 4,554,473, which is a continuation-in-part of Ser. No. 244,971, Mar. 18, 1981, abandoned. This application Nov. 18, 1985, Ser. No. 799,000

Claims priority, application Switzerland, May 10, 1980, 3658/80

The portion of the term of this patent subsequent to Nov. 19, 2002, has been disclaimed.

Int. Cl.[4] H02K *21/12*

U.S. Cl. 310—67 R **6 Claims**



1. A brushless direct current motor system, said system including an outer rotor type motor, comprising:

a cup-shaped rotor housing having a shaft concentrically mounted therein extending internally thereof, the outer portion of said housing being formed as a drive boss to receive at least one load member for the direct driving thereof, the load member being a fan wheel having a plurality of blades, the fan wheel being a unitized assembly including a hub and radially extending fan blades mounted thereon uniformly around the periphery;

a bearing system in said motor receiving said shaft so as to rotate said rotor housing;

stator means concentrically mounting said bearing system within said motor, said rotor housing including permanent magnets on its inside surface and being mounted to rotate around the periphery of said stator means and separated by an air gap, the outside of said rotor housing at its closed end being provided with a step-wise reduction in its outer diameter to provide a reduced diameter hub portion thereof, allowing the outside of this portion of the rotor housing to mount and drive said unitized assembly; and

the hub of said unitized assembly being dimensioned to be press fit over the reduced diameter hub portion of said outer rotor.

4,698,543

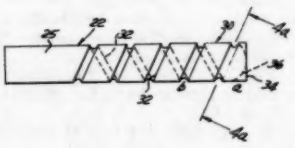
ELECTRODE FOR ELECTRICAL DISCHARGE MACHINING

Roy D. Patton, Mooresville, N.C., assignor to Colt Industries Inc., New York, N.Y.

Filed Jan. 29, 1982, Ser. No. 343,866

Int. Cl.[4] H01J *1/00, 17/04, 19/00*

U.S. Cl. 313—357 **5 Claims**



1. An electrode for small hole cutting electrical discharge machining, comprising:

an elongated electrode of electrically conductive material, said electrode having a mounting shank at one end;

a spiral, groove portion extending along a substantial length of the electrode and terminating proximate its machining end for receiving a stream of coolant and providing its flow into and through the gap during cutting; and

a blunt, relatively planar cutting surface at the other end of said electrode.

4,698,544

IMAGING AND STREAKING TUBES INCLUDING A LID FOR COVERING AN APERTURE IN A WALL SEPARATING THE TUBE ENVELOPE INTO SPACES DURING FABRICATION THEREOF

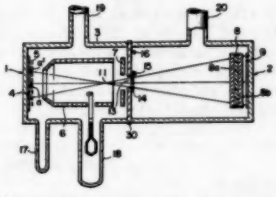
Katsuyuki Kinoshita, and Yoshiji Suzuki, both of Hamamatsu, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Hamamatsu, Japan

Division of Ser. No. 551,835, Nov. 15, 1983, Pat. No. 4,595,375. This application Jan. 30, 1986, Ser. No. 824,692

Claims priority, application Japan, Nov. 24, 1982, 57-205769; Sep. 16, 1983, 58-163940

Int. Cl.[4] H01J *9/233, 29/36, 40/06, 43/08*

U.S. Cl. 313—379 **8 Claims**



1. An imaging tube for observing a light image, said imaging tube having an evacuated envelope with a longitudinal axis, a photoelectric layer at one end of said evacuated envelope and a micro-channel-plate for multiplying photoelectrons emitted by said photoelectric layer located at the other end of said envelope, said imaging tube further comprising:

a separation wall positioned within said envelope between said photoelectric layer and said micro-channel-plate, said separation wall having an aperture therein on said longitudinal axis at or near the crossover point of photoelectrons propagated along said axis;

a lid secured to said separation wall, said lid being movable

between a first position at which said aperture is closed and a second position at which said aperture is opened; and

means for moving said lid from said first to said second position, said lid being maintained at said first position while said photoelectric layer is being fabricated and moved to said second position after fabrication has been completed to permit passage of electrons from said photoelectric layer to said micro-channel-plate.

4,698,545

COLOR PICTURE TUBE HAVING A SHADOW MASK WITH A CR ENRICHED LAYER

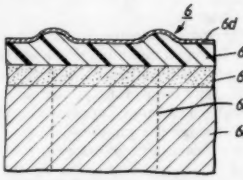
Michihiko Inaba; Tetsuo Fujiwara, both of Yokohama; Masaharu Kanto, Hyogo; Yasuhisa Ohtake, Fukaya, and Fumio Mori, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 17, 1985, Ser. No. 776,808

Claims priority, application Japan, Sep. 26, 1984, 59-201268; Mar. 27, 1985, 60-60937

Int. Cl.[4] H01J *29/07*

U.S. Cl. 313—402 **9 Claims**



1. A color picture tube comprising:

(a) a tube element composed of an Fe-Ni alloy comprising Fe as its main component, and at least some Cr;

(b) a Cr-rich layer formed on the surface of said tube element, wherein said Cr-rich layer has a Cr content of 1.2 to 10 times that of the Cr content of said tube element; and

(c) a black oxide film formed on the surface of said Cr-rich layer, wherein said black oxide film has a spinel structure and is represented by chemical formula

$$Cr_xNi_yFe_{(3-x-y)}O_4$$

wherein $(0<x, y<3)$.

4,698,546

APPARATUS FOR FORMING ELECTRON BEAMS

Arthur Maitland, Fife, Scotland; Hugh Menown, Chelmsford, England; Ian A. Strudwick, Chelmsford, England; Clifford R. Weatherup, Chelmsford, England, and Robert J. Carman, Fife, Scotland, assignors to English Electric Valve Company Limited, Chelmsford, United Kingdom

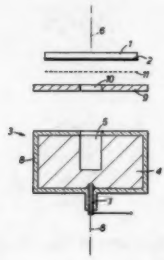
Filed Dec. 18, 1984, Ser. No. 683,035

Claims priority, application United Kingdom, Dec. 20, 1983, 8333879; Dec. 20, 1983, 8333880; May 30, 1984, 8413791; Dec. 10, 1984, 8431116

Int. Cl.[4] H01J *1/16, 17/06, 29/04*

U.S. Cl. 313—446 **63 Claims**

1. Apparatus for forming an electron beam, comprising: an envelope having a gas-filling of a predetermined pressure therein; an anode member; a cathode member, said anode and cathode members being disposed within said envelope with a predetermined position relative to one another, said cathode member being of an electrically conductive material and having a front surface, said cathode member including an electrically insulating material covering at least substantially its whole surface, except for a part of said front surface, which would otherwise be exposed to said gas filling; and means for applying a voltage between said anode member and said cathode member, said part of said front surface having dimensions such that, in combination with the relative position of said anode and cathode members and the predetermined pressure of



said gas filling, and upon the application of a suitably high voltage between said anode member and said cathode members, a collimated electron beam is formed extensive in a direction away from said part of said front surface.

4,698,547

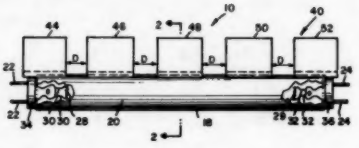
LOW PRESSURE ARC DISCHARGE LAMP APPARATUS WITH MAGNETIC FIELD GENERATING MEANS

Mark W. Grossman, Belmont; William A. George, Rockport, and Jakob Maya, Brookline, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Feb. 18, 1986, Ser. No. 830,151

Int. Cl.[4] H01J *1/50, 17/14, 61/35*

U.S. Cl. 313—485 **8 Claims**



1. A low-pressure arc discharge apparatus comprising:

a low-pressure arc discharge lamp for producing a positive column. said arc discharge lamp having a sealed tubular envelope of light-transmitting vitreous material containing an ionizable medium and having opposing ends, a pair of electrodes respectively sealed at said ends of said envelope, and a pair of electrical conductors respectively connected to each of said pair of electrodes, said low-pressure arc discharge lamp operating at an ambient temperature greater than about 25° C.; and

magnetic field generating means disposed along said low-pressure arc discharge lamp for applying a constant transverse magnetic field of a predetermined magnetic field intensity over at least a portion of said positive column produced in said arc discharge lamp, said magnetic field intensity of said magnetic field generating means being greater than $600X+70$ gauss, the value X being equal to the quotient obtained by dividing the weighted mean value of the atomic weight of rare gas atoms in said envelope by a product of the pressure value in said envelope, the square of the value of the inner radius of said envelope, and the length of said envelope, said magnetic field generating means being effective to increase the output of said low-pressure arc discharge lamp.

4,698,548

LAMP INCORPORATING PHOSPHOR BLEND OF CALCIUM FLUOROPHOSPHATE AND STRONTIUM HALOPHOSPHATE

Charles F. Chenot, Towanda, Pa., and Robert E. Taylor, deceased, late of Odessa, N.Y., by Vincent Chiola, Towanda, Pa., executrix; Wolfgang Walten, Brookline, Mass., assignors to GTE Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 787,815, Oct. 15, 1985, abandoned, which is a continuation of Ser. No. 290,538, Jun. 18, 1981, abandoned, which is a continuation of Ser. No. 830,791, Sep. 6, 1977, abandoned. This application Mar. 5, 1987, Ser. No. 925,951

Int. Cl.[4] H01J *61/44*

U.S. Cl. 313—487 **3 Claims**

1. A fluorescent lamp comprising a sealed envelope, a pair of opposing electrodes, a fill of inert gas and mercury, and a phosphor coating on the internal walls of said envelope, said phosphor consisting of 95.2 to 97.1 weight percent of calcium fluorapatite having the formulated composition

$$Ca_{4.63}F_{0.93}Mn_{0.152}Sb_{0.06}Cd_{0.06}(PO_4)_3,$$

and 2.9 to 4.8 weight percent

$$Sr_{9.9}Eu_{0.1}Cl_2(PO_4)_6$$

divalent europium activated strontium halophosphate, the x and y chromaticity coordinates of the light emission of the lamp being about 0.382–0.388 and 0.392–0.398 respectively, the lumens per watt efficiency of the lamp being greater than that of a lamp utilizing a standard cool white calcium fluoroapatite phosphor.

4,698,549

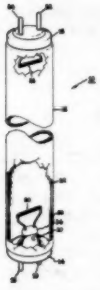
D.C. LAMP DISCHARGE GAS PUMPING CONTROL

Edward E. Hammer, Mayfield Village, and Eugene Lemmers, Cleveland Heights, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 627,132, Jul. 2, 1984, abandoned. This application Sep. 2, 1986, Ser. No. 903,913

Int. Cl.[4] H01J *61/42, 61/28*

U.S. Cl. 313—490 **8 Claims**



1. A low-pressure mercury discharge lamp for operation on DC electrical power comprising:

an elongated cylindrical sealed vitreous envelope means having a fluorescent phosphor coating material disposed on the inner surface thereof;

anode electrode means disposed within said envelope means at a first end thereof;

cathode electrode means disposed within said envelope means at a second end thereof spaced from said first end;

an inert fill gas disposed within said envelope means;

a discharge gas comprising mercury vapor;

an amalgam disposed as a generally circular band having an area in the range of 1.1 to 7.0 square inches on the interior surface of said envelope means at only said first end thereof, said amalgam having a composition of 50 to 80 wt. % mercury and 20 to 50 wt. % indium, and

said phosphor coating material overlaying said amalgam.

4,698,550

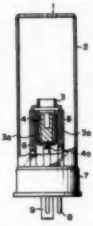
HOLLOW CATHODE LAMP

Masayasu Kobayashi, Hamamatsu, Japan, and Julius R. Eno, Jr., Basking Ridge, N.J., assignors to Hamamatsu Photonics Kabushiki Kaisha, Hamamatsu, Japan

Filed May 6, 1985, Ser. No. 731,328

Int. Cl.[4] H01J *17/06*

U.S. Cl. 313—618 **7 Claims**



1. In a hollow cathode lamp usable as a light source for atomic absorption and scintillation spectroscopies including a sealed envelope containing an inert gas and provided with a light emission window, a cathode disposed in said envelope opposite said window, and an anode disposed in said envelope coaxially with said cathode and between said cathode and said light emission window; the improvement wherein said anode consists of a metal cylinder having a uniform inner diameter D over its entire length L, said diameter D being greater than the diameter of said cathode, and wheren L is equal to or greater than D, whereby said metal cylinder forming said anode further acts to trap evaporated cathode material so as to block the diffusion of evaporated cathode material to said light emission window.

4,698,551

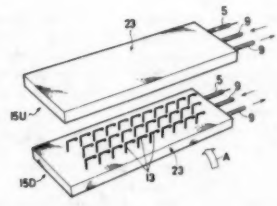
DISCHARGE ELECTRODE FOR A GAS DISCHARGE DEVICE

Ethan D. Hoag, Boston, Mass., assignor to Laser Corporation of America, Lowell, Mass.

Filed Mar. 20, 1986, Ser. No. 841,767

Int. Cl.[4] H01J *17/04;* H01S *3/09*

U.S. Cl. 313—619 **1 Claim**



1. A discharge electrode for a gas discharge device of the type in which a plurality of pin-shaped electrodes are disposed in a gas flow, comprising:

a. a base plate comprised of a molded portion sandwiched between a ceramic insulating portion and a copper shield plate;

b. a ballast capacitor disposed within the molded portion of said base plate;

c. electrical cable means for connecting said ballast capacitor to an electrical source disposed externally of said base plate;

d. cooling means disposed within the molded portion of said base plate near the ceramic insulating portion of said base plate for cooling the ceramic insulating portion of said base plate to prevent thermal deformation thereof; and

e. a plurality of pin-shaped electrodes arranged in a multiplicity of staggered rows, each pin shaped electrode of said plurality of pin shaped electrodes comprising a curled portion, an extension portion, and a post portion, said curled portion being formed by curling an end of a wire member in an approximately circular shape, said extension portion being formed by a predetermined length of said wire member extending from said curled portion, said post portion being formed with a predetermined length of said wire member by bending the base portion of said extension portion into an approximately L shape, said post portion of each electrode penetrating the insulating portion of said base plate and being connected within the molded portion of said base plate to said ballast capacitor, and said extension portion being disposed in the gas flow so as to lie transverse to the direction of the gas flow.

4,698,552

LIGHT CONTROL APPARATUS FOR AUTOMOBILE

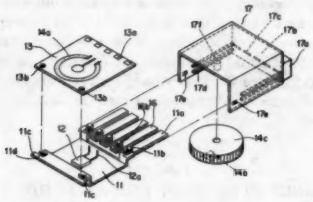
Katsuhiro Minami; Hitoshi Iwata, and Kenichi Kinoshita, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Japan

Filed May 3, 1985, Ser. No. 730,186

Claims priority, application Japan, May 4, 1984, 59-64736[U]; May 4, 1984, 59-64737[U]

Int. Cl.[4] B60Q *1/02*

U.S. Cl. 315—82 **8 Claims**



1. A light control apparatus for an automobile comprising

a casing having a plurality of walls defining a chamber therein, said casing further having an opening at a selected one of said walls, a selected another of said walls having a plurality of holes therein, and an outer shell projecting adjacent said another wall;

a mounting plate adapted to radiate heat and mounted within said casing, said mounting plate having at least one terminal section inserted through one of said holes and accommodated in the outer shell which functions as a terminal housing and said mounting plate having a power transistor mounted thereon, said terminal section also being formed to function as a heat-radiating member;

a substrate mounted on said mounting plate and adapted to serve as a printed board including a printed resistor coating and electronic parts; and

a knob provided movably within said casing and having a variable resistor terminal adapted to slide over said resistor coating upon said movement within said casing, part of said knob projecting from said casing through said opening for manual operation,

wherein said mounting plate is channel-shaped and has a main section and a pair of first and second wing sections elevated above the main section, said at least one terminal section extending from a top of the first wing section, said substrate bridging over the wing sections and said main section of the mounting plate being separated with a gap formed therebetween on account of a difference of elevation of the wing sections and the main section, said power transistor mounted within said gap.

4,698,553

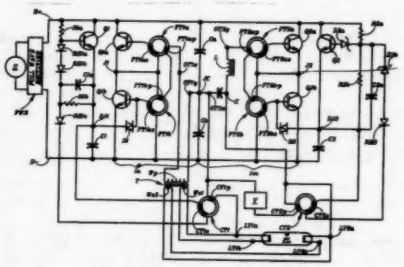
ELECTRONIC POWER SUPPLY SYSTEM

Ole K. Nilssen, Caesar Dr., Barrington Hills, Ill. 60010

Filed Dec. 3, 1984, Ser. No. 677,562

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—200 R **18 Claims**



1. The combination comprising:

a main power source operable to provide an AC voltage at an output;

an inductor means and a capacitor means effectively series-connected across the output, the inductor means being resonant with the capacitor means at or near the frequency of the AC voltage;

load means effectively connected in parallel with the capacitor means, the load means requiring conditioning before being operable to effectively absorb power, the load means having an auxiliary input adapted to receive power operable to effect the required conditioning;

an auxiliary power source connected with the auxiliary input and operable to provide power thereto, thereby to effect the required conditioning; and

means operable to prevent the main power source from providing the AC voltage at the output until after the auxiliary power source has provided power to the auxiliary input for a pre-determined period of time.

4,698,554

VARIABLE FREQUENCY CURRENT CONTROL DEVICE FOR DISCHARGE LAMPS

Edward H. Stupp, Spring Valley, N.Y., and Mark W. Fellows, Monroe, Conn., assignors to North American Philips Corporation, New York, N.Y.

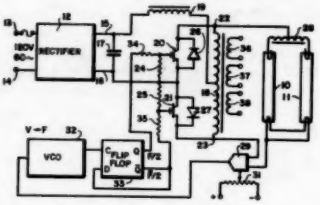
Continuation of Ser. No. 679,328, Dec. 7, 1984, Pat. No. 4,585,974, which is a division of Ser. No. 455,395, Jan. 3, 1983, Pat. No. 4,498,031. This application Oct. 11, 1985, Ser. No. 786,774

Int. Cl.[4] G05F *1/00*

U.S. Cl. 315—307 **6 Claims**

1. A circuit for controlling a gas discharge lamp comprising, a pair of input terminals for a source of pulsating DC voltage, a variable frequency driven inverter that produces a high frequency waveform and has input means connected to said input terminals, a non-resonant coupling network including a reactive ballast impedance for coupling an output of said driven inverter to said discharge lamp, means responsive to a high frequency current flowing through said discharge lamp for monitoring the level of said lamp current, and frequency control means having an input coupled to said current monitoring means and an output coupled to said driven inverter for supplying a cycle-by-cycle frequency control signal thereto so

as to alter the frequency of the driven inverter on a cycle-by-cycle basis of the high frequency waveform and as a function



of the amplitude of lamp current and in a sense so as to regulate the lamp current within predetermined limits.

4,698,555

CATHODE RAY TUBE DISPLAY SYSTEM

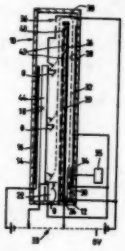
Alan G. Knapp, Crawley, and Daphne L. Lamport, Godstone, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 9, 1986, Ser. No. 939,584

Claims priority, application United Kingdom, Jan. 30, 1986, 8602300

Int. Cl.[4] H01J *29/70*

U.S. Cl. 315—366 **3 Claims**



1. A cathode ray tube display system comprising a cathode ray display tube having means for producing an electron beam and directing the electron beam into a space between a planar array of elongate deflection electrodes and the input side of an electron multiplier, a screen disposed adjacent the output of the electron multiplier onto which the current multiplied beam from the electron multiplier is directed, and driving means connected to the electron beam producing and directing means and to the deflection electrodes for applying potentials thereto, the driving means being operable to provide an accelerating potential for the beam and to switch the potential applied to each of the deflection electrodes between a first predetermined potential V_1 and a second predetermined potential V_2 and to control the sequence in which each of the electrodes is switched so as to cause the electron beam entering the space to be scanned across the input side of the electron multiplier, characterised in that the beam acceleration voltage Va and the amplitude Vs of the voltage change applied to the deflection electrodes satisfy the relationship $1.3\ Vs<Va<2\ Vs$, where $Vs=V_2-V_1$.

4,698,556

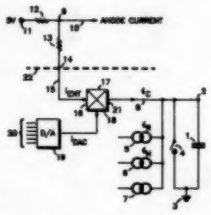
TIMEBASE CIRCUIT

David T. Jobling, Geneva, and Anthony D. Newton, Le Vaud, both of Switzerland, assignors to Motorola Inc., Schaumburg, Ill.

Filed May 31, 1985, Ser. No. 739,948

Int. Cl.[4] H01J *29/56*

U.S. Cl. 315—371 **8 Claims**



1. A correction circuit for a television picture tube timebase comprising: means for providing an electrical signal dependent upon the instantaneous EHT voltage of the tube; means for providing an adjustable reference signal comprising a digital-to-analog converter having input means for receiving a selectable digital code and an output for providing an analog output signal; and a multiplier for multipling the electrical signal and the reference signal; to provide a correction signal for correcting at least one picture dimension for changes in EHT voltage.

4,698,557

CIRCUIT ARRANGEMENT FOR THE CONTROL OF A PICTURE TUBE

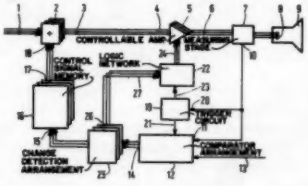
Hartmut Harlos, Norderstedt, Fed. Rep. of Germany, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Oct. 15, 1985, Ser. No. 787,395

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1984, 3437952

Int. Cl.[4] H01J *29/52*

U.S. Cl. 315—383 **5 Claims**



1. Circuit arrangement for the control of at least one beam current in a picture tube by a picture comprising

a control loop which in one sampling interval obtains a measuring signal from the value of the beam current on the occurrence of a given reference level in the picture signal, stores a control signal derived therefrom until the next sampling interval and thereby adjusts the beam current to a value preset by a reference signal.

and a trigger circuit which suppresses auxiliary pulses used to generate the beam current after the picture tube has been started up and issues a switching signal for the purpose of closing the control loop during the sampling intervals and for releasing the control of the beam current by the picture signal after the measuring signal has exceeded the threshold value,

a change detection arrangement which delivers a change signal when the stored signal has assumed a largely constant value, and

a logic network which does not release the control of the

beam current by the picture signal outside the sampling intervals until the change signal has also been issued after the switching signal.

4,698,558

IMAGE PICKUP APPARATUS

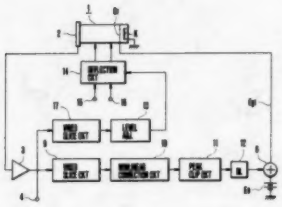
Takehiro Kakizaki, Sagamihara, and Shoji Araki, Atsugi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 28, 1983, Ser. No. 546,732

Claims priority, application Japan, Oct. 29, 1982, 57-190483

Int. Cl.[4] H01J *29/52, 31/26;* **H04N** *5/235*

U.S. Cl. 315—383 **12 Claims**



1. Image pickup apparatus, comprising:

a source of electron beam current;

pickup tube means havng a photoelectric transducer surface and a cathode connected to said source of electron beam current for producing an output signal representing an image by scanning said photoelectric transducer surface with an electron beam produced by said cathode;

deflection means arranged adjacent said tube means for controlling the direction of scanning of said electron beam during production of said output signal and including vertical centering control means for vertically shifting the scanning position of said electron beam on said photoelectric transducer surface; and

control means receiving said output signal for producing first and second control signals therefrom when said output signal exceeds a predetermined level and including a nonlinear correction circuit for varying said first and second control signals nonlinearly in response to known transfer characteristics of said photoelectric transducer surface, a varied first control signal being fed to said cathode for increasing the beam current thereto and a varied second control signal being fed to said vertical centering control means in said deflection means for causing said deflection means to shift vertically upwardly said electron beam produced by said cathode toward a region on said photoelectric transducer surface already scanned by said electron beam.

4,698,559

POWER AMPLIFIERS FOR DRIVING INDUCTIVE LOADS

Bruce K. Baur, Milwaukie, and Gordon W. Meigs, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 651,732, Sep. 17, 1984. This application Jun. 9, 1986, Ser. No. 871,983

Int. Cl.[4] G01S *1/16, 1/18*

U.S. Cl. 315—408 **9 Claims**

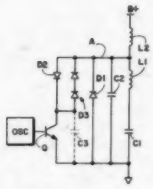
1. A power amplifier circuit for driving an inductive load coupled between first and second nodes of the amplifier circuit, comprising:

capacitor means coupled between said first and second circuit nodes,

first unidirectionally-conductive means having first and second terminals, the first terminal being coupled to the first circuit node,

a transistor having its collector coupled to the second terminal of the first unidirectionally-conductive means and having its emitter coupled to the second circuit node, the direction of conduction of the first unidirectionally-conductive means being the same as the direction of conduction through the collector-emitter path of the transistor,

second unidirectionally-conductive means connected in parallel with the first unidirectionally-conductive means for conducting current in the opposite direction from the direction of conduction of the first unidirectionally-conductive means, the second unidirectionally-conductive



means having first and second terminals which are in d.c. coupled relationship with the first and second terminals respectively of the first unidirectionally-conductive means, and

third unidirectionally-conductive means coupled between the first and second circuit nodes, the direction of conduction of the third unidirectionally-conductive means being opposite from that of the first unidirectionallyconductive means and the collector-emitter path of the transistor.

4,698,560

ADJUSTING DEVICE, ESPECIALLY FOR LOCKING AND UNLOCKING MOTOR VEHICLE DOORS

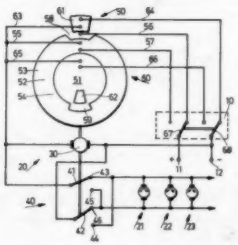
Marcel Andrei-Alexandru, Bietigheim-Bissingen; Wolfgang Kofink, Aichwald-Lobenrot; Eckhardt Schmid, Brackenheim, and Volker Tietz, Heilbronn, all of Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Nov. 25, 1985, Ser. No. 801,490

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1984, 3442894

Int. Cl.[4] H02P *1/54*

U.S. Cl. 318—54 **18 Claims**



1. An adjusting device for locking and unlocking motor vehicle doors, comprising:

a first electromechanical adjusting unit for driving an associated actuator between two end positions in a first time period;

a plurality of other electromechanical adjusting units for driving respective other associated actuators between two end positions in a second period of time;

at least one operating switch for controlling said first and said plurality of other adjusting units;

limit switch means for switching off said first adjusting unit at a predetermined one of said end positions;

said first time period between said first and second end

positions of said first adjusting unit being longer than said second time period of the other adjusting units of said plurality of adjusting units; and

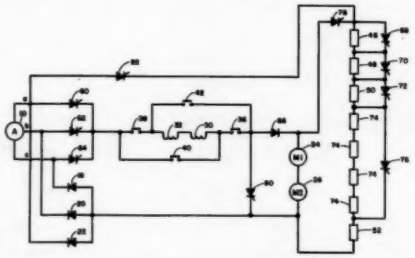
a switching unit operated by said first adjusting unit via which said second time period of the other adjusting units is preset.

4,698,561

USE OF SCR'S IN EXTENDED RETARDING

Sabern D. Buchanan, and Stephen L. Faulkner, both of Tulsa, Okla., assignors to Unit Rig & Equipment Company, Tulsa, Okla.

Filed Sep. 29, 1986, Ser. No. 913,125
Int. Cl.[4] H02P *3/12*
U.S. Cl. 318—87 **18 Claims**



1. In a drive system for a vehicle wherein an alternator driven by a power source produces AC current that is rectified to DC current before being used to power wheel motors and wherein the drive system provides for retarding of the motion of the vehicle by suspension of the DC current from the alternator that is driving the wheel motors and then allowing the wheel motors to generate a DC current that is directed through a series of resistors to dissipate the energy, the specific improvement comprising:

(a) a first SCR located between the output of the DC current generated by the wheel motors during retarding of the motion of the vehicle and the series of resistors through which the DC current is directed to dissipate the energy;

(b) at least one circuit containing a second SCR wherein said circuit when said second SCR is conductive shunts a portion of the series of resistors through which the DC current generated by the wheel motors is directed; and

(c) at least one circuit containing a third SCR wherein said circuit when said third SCR is conductive delivers current from said alternator to the cathode of said first SCR such as to back bias said first SCR and allow it to be turned off.

18. A method of operating a drive system of a vehicle wherein an alternator driven by a power source produces AC current that is rectified to DC current before being used to power wheel motors and wherein the drive system provides for retarding of the motion of the vehicle by suspending the DC current from the alternator powering the wheel motors and then allowing the wheel motors to generate a DC current which is directed through a resistive grid to dissipate the energy and thus apply retarding torque decelerating the vehicle in which at least one SCR is located between the output of the DC current generated by the wheel motors during retarding of the motion of the vehicle and the resistive grid through which the DC current is directed to dissipate the energy, and a plurality of shunting circuits is utilized each containing a separate SCR that when conductive shunts a portion of the resistive grid and in which at least one circuit contains a SCR that when conductive delivers AC current from the alternator to the cathode of the at least one SCR located between the output of the DC current generated by the wheel motors and the resistive grid, the method of operating the drive system comprising the steps of:

(a) activating the SCR in said one circuit that delivers AC current from the alternator to the cathode of the at least one SCR located between the output of the DC current generated by the wheel motors and the resistive grid;

(b) deactivating the at least one SCR located between the output of the DC current generated by the wheel motors and the resistive grid; and

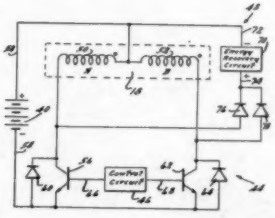
(c) deactivating the SCR in said one circuit that delivers AC current from the alternator to the cathode of the at least one SCR located between the output of the DC current generated by the wheel motors and the resistive grid, thus allowing further selective activation and deactivation of the SCR's of the plurality of shunting circuits.

4,698,562

MOTOR ELECTRICAL POSITIONING SYSTEM AND THE APPLICATION THEREOF WITHIN VEHICLE TRACTION DRIVES

Allan R. Gale, Allen Park, and David J. Gritter, Southfield, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 538,859, Oct. 4, 1983, abandoned. This application Apr. 24, 1986, Ser. No. 855,981
Int. Cl.[4] H02K *29/00*
U.S. Cl. 318—254 **15 Claims**



1. An improved drivetrain adapted for use with an electric vehicle having at least one tractive wheel and including a power source, a single-phase brushless motor for imparting torque to said wheel and including a rotor, an inverter for providing a power input from said power source and a power output to said motor in response to switch command signals, and a control circuit operative to receive an operator demand signal and to generate said switch command signals as a function thereof, wherein said improvement comprises:

a motor positioning circuit operative to sense rotor speed and to effect rotor positioning at a fixed angular position when sensed rotor speed is below a predetermined rate to ensure the presence of a starting torque upon subsequent energization of said motor.

4,698,563

SEMICONDUCTOR ELECTRIC MOTOR HAVING A ROTARY TRANSFORMER TO EXCITE A ROTOR

Itsuki Ban, 3-50-18 Higashi-Ohizumi, Nerima-ku, Tokyo, Japan

Filed Dec. 16, 1986, Ser. No. 942,447
Claims priority, application Japan, Mar. 4, 1986, 61-45257
Int. Cl.[4] H02K *29/12;* **H02P** *6/02*
U.S. Cl. 318—254 **21 Claims**

1. A m-phase semiconductor electric motor (m=1, 2, 3, . . .) having field magnetic poles constituting a rotor, said motor comprising:

a rotor of magnetic material having 2n magnetic poles (n being a positive integer not smaller than 2), said magnetic poles consisting of N and S poles having equal widths and disposed alternately circumferentially;

a rotary shaft and a bearing for rotatably supporting said rotor;

an exciting coil for exciting said N and S magnetic poles;

a rotary transformer including a first and a second soft-fer-

rite core, said first and second cores having magnetic path open ends and being arranged to rotate relative to each other with said magnetic path open ends facing each other through a slight air gap therebetween, said first core being connected at its central hole with said rotary shaft of said rotor, said second core being fixed to an outer casing;

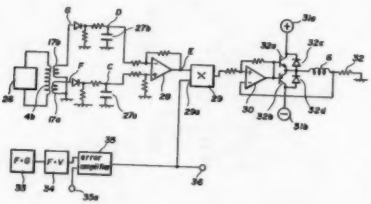
a primary and a secondary coil mounted on said second and first cores respectively;

a high frequency oscillator for supplying said primary coil with a high frequency current;

an electric circuit for rectifying the output of said secondary coil to thereby energize said exciting coil by said rectified output;

a fixed armature of magnetic material arranged to face said N and S magnetic poles of said rotor with an air gap therebetween, said fixed armature being provided with m phases of armature coils mounted thereon;

position detecting means for generating m phases rotor position detecting signals, said m phases rotor position detecting signals having the same waveforms, each of said waveforms having positive and negative portions alternating every 180 degrees electrical angle, each of said positive and negative portions having an early portion of 90 degrees in which an amplitude increases gradually from zero and a latter portion of 90 degrees in which the amplitude decreases gradually to zero;



means for providing a reference voltage for instructing output torque;

a multiplier circuit for multiplying said position detecting signal for every phase by said reference voltage;

an armature current detecting circuit for detecting an armature current in said armature coil for every phase;

an armature current control circuit for comparing a voltage corresponding to the armature current for every phase detected in said armature current detecting circuit with an output voltage of said multiplier circuit to thereby control the armature current in said armature coil for every phase such that a current path for said armature coil is cut off to cause magnetic energy stored in said armature coil to flow back to a DC source when said voltage corresponding to said armature current is, larger than said output voltage of said multiplier circuit, and current conduction of said armature coil is restored when said voltage corresponding to said armature current becomes smaller than said output voltage of said multiplier circuit by a predetermined value; and

said DC source having an output voltage which is set corresponding to the output torque and revolutional speed of said motor so that the armature current has a value corresponding to said output voltage of said multiplier circuit.

4,698,564

SPINNING OPTICS DEVICE

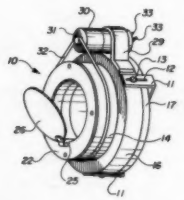
Sidney H. Slavin, 9505 Carterwood Rd., Richmond, Va. 23229

Division of Ser. No. 151,585, May 20, 1980, Pat. No. 4,522,474. This application Jun. 7, 1985, Ser. No. 742,416

Int. Cl.[4] H02P *1/22;* **G02C** *1/00;* **A61B** *3/00*

U.S. Cl. 318—257 **12 Claims**

1. A control circuit for rotating an ophthalmic lens rotatably mounted on a frame comprising, in combination: a source of electric power; a variable speed, reversible D.C. electric motor driveably connected to said lens; a memory having a digital data stored therein representing a plurality of operating modes for said motor; means for reading said digital data sequentially from said memory; and means for feeding said digital data from said memory to said motor to operate said motor in said plurality of operating modes; wherein said operating modes for said motor include a plurality of motor speeds, direction of rotation and duration of operation of said motor; wherein said means for reading data sequentially from said memory include an address counter having an output connected to said memory, means for resetting said address counter and a clock connected to said source of power for incrementing said address counter; and wherein said means for feeding data from said memory to said motor include a pulse generator having a control input and an output for providing a pulse train, means for conducting said pulse train from the output of said pulse generator to said



motor to drive said motor, means for conducting a first portion of the digital data from said memory to said pulse generator to vary the frequency of said pulse train thereby varying the speed of said motor.

9. A control circuit for rotating an ophthalmic lens rotatably mounted on a frame, the circuit comprising, in combination: a source of electric power, a variable speed, reversible electric motor driveably connected to said lens, a memory having digital data stored therein representing a plurality of operating modes for said motor, means for reading said digital data sequentially from said memory and means for feeding said digital data from said memory to said motor to operate said motor in said plurality of operating modes, and wherein said means for feeding data from said memory to said motor include a pulse generator having a control input and an output for providing a pulse train and means for conducting at least a portion of said pulse train from the output of said pulse generator to said motor to drive said motor and vary its operating mode.

4,698,565

HOIST WITH OVERLOAD SAFETY PROTECTION

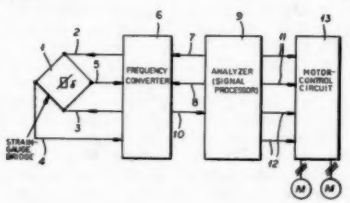
Klaus Behnke, and Anton Münzenbrock, both of Dortmund, Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jul. 18, 1985, Ser. No. 756,749

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1984, 3426746

Int. Cl.[4] H02P *7/67*

U.S. Cl. 318—318 **5 Claims**



1. In a hoist with at least one hoist motor, a motor controller for said hoist motor, and an overload safety device operating

on said motor controller, wherein said overload safety device includes a cable load pick up with a tension measuring bridge, and an analyzer said tension measuring bridge being connected by two conductors to a bridge supply voltage generator and having two output conductors for transmission of an output signal of said tension measuring bridge, said analyzer acting on said motor controller, the improvement wherein

between said analyzer and said tension measuring bridge a frequency converter with a frequency generator is connected, said frequency converter transforming said output signal of said tension measuring bridge into a periodic signal;

said analyzer has at least one counter with a settable initial state, at least one switch and one frequency divider;

said frequency divider produces a periodic control signal as a gate pulse for said counter from a reference frequency of a reference signal source;

cycles of said frequency generator are countable with said counter during said gate pulse;

said motor controller is cut out by said counter when a given counting state is reached; and

said gate pulse is adjustable so that the duration of said gate pulse is at least equal to the period of said load fluctuations.

4,698,566

APPARATUS FOR CONTROLLING MOTOR SPEED

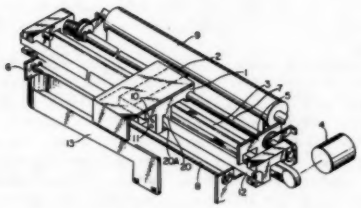
Shigeru Okamura, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 9, 1984, Ser. No. 628,760

Claims priority, application Japan, Jul. 29, 1983, 58-137819

Int. Cl.[4] H02P *5/00*

U.S. Cl. 318—332 **11 Claims**



1. A rotation speed controlled motor apparatus comprising:

a motor subjected to a frictional load;

driving means for driving said motor with a drive force corresponding to an input signal;

means for applying a first input signal to said driving means, the first input signal being of less magnitude than required to rotate said motor;

means for generating a motor rotation speed signal which is a function of the rotation speed of said motor; and

means for comparing said motor rotation speed signal with a predetermined signal level to produce a second input signal and applying said second input signal to said driving means in addition to said first input signal during an interval while the motor rotation speed is lower than a target speed, the second input signal being of sufficient magnitude to rotate said motor.

4,698,567

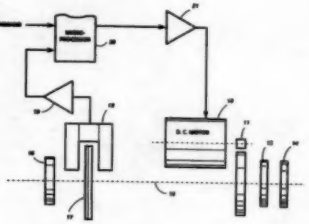
RIBBON DECK MOTOR CONTROL

Johannes F. Gottwald, Park Ridge, and Dennis W. Gruber, Arlington Heights, both of Ill., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 27, 1985, Ser. No. 818,578

Int. Cl.[4] B41J *33/34*

U.S. Cl. 318—480 **2 Claims**



1. Apparatus for controlling the erase and print ribbons of a typewriter comprising:

a dc motor,

a shaft driven by said motor,

an erase ribbon lift cam mounted on said shaft,

a print ribbon lift cam mounted on said shaft,

an optical sensor,

a disk mounted on said shaft comprising marks optically detectable by said sensor, said marks comprising a relatively long mark at a first point on said disk, and the remainder of the disk having relatively short marks evenly spaced around the disk except for a relatively long gap between marks at a second point opposite said long mark, one of said first and second points corresponding to the shaft position when the print and erase ribbons are in position to be struck, and the other corresponding to the shaft position when the erase ribbon only is in position to be struck, and

means responsive to the output of said sensor for calculating the rate of shaft rotation by measuring the time between the detection of said short marks, and means for detecting that the position is at said first point by detecting said long mark, and at said second point by detecting said long gap.

4,698,568

ANTIEXPLOSION STRUCTURE IN A WORKING ROBOT

Shun-ichi Nishizawa; Toshio Tsubota, and Takashi Chikura, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 842,845

Claims priority, application Japan, Mar. 29, 1985, 60-63731

Int. Cl.[4] H02H *7/08*; B25J *19/06*

U.S. Cl. 318—481 **4 Claims**

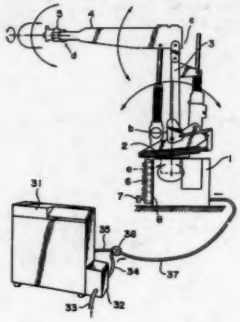
1. In an electric motor drive type robot of the type intended for operation in an explosive atmosphere and including at least one electric drive motor and electric wiring for connecting said electric drive motor to an external power source, the improvement of antiexplosion means for preventing explosion of the explosive atmosphere by said electric drive motor and said electric wiring, said antiexplosion means comprising:

sealing means for hermetically enclosing said electric drive motor and said electric wiring from the explosive atmosphere;

air supply means for continuously supplying dry air from an external source into said sealing means and for continuously exhausting said dry air from said sealing means, and therefore for creating within said sealing means a continuous flow of said dry air maintained at a pressure above the pressure of the surrounding explosive atmosphere and

flowing around and surrounding said electric drive motor and said electric wiring; and

pressure detecting means for continuously detecting the



pressure of said dry air within said sealing means and for, upon the thus detected pressure dropping below a predetermined value, immediately interrupting the supply of electric current to said electric drive motor.

4,698,569

APPARATUS FOR LOCATING A CARRIER AT A DESIRED POSITION

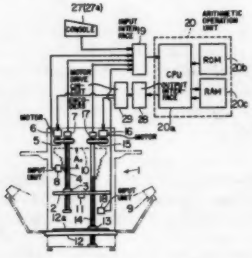
Yoshikazu Kimura, 555 Oiwake-cho, Kusatsu-shi, Shiga; Ikuo Sho, 480-1 Takamiya-cho, and Yukio Hatabe, 6-47 Sakaemachi 2-chome, Hikone-shi, Shiga, all of Japan

Filed Jun. 5, 1986, Ser. No. 872,382

Claims priority, application Japan, Jun. 13, 1985, 60-128928; Dec. 3, 1985, 60-272195

Int. Cl.[4] G05B *19/20*

U.S. Cl. 318—567 **11 Claims**



1. An apparatus for locating a moving carrier at a desired position in a photographic reproducing machine, the apparatus comprising:

a shifting means for shifting a carrier in a desired direction;

a driving means for rotatably driving the shifting means;

a position generating means operable in association with the shifting means;

an input means for inputting a reference position signal, the input means being located within the range of movement of the carrier;

a target setting means;

an arithmetic operation unit; and

a motor driving circuit;

wherein the arithmetic operation unit comprises a first memory for storing current position data of the carrier, the first memory being adapted to count pulses from the position signal generating means, a second memory for storing data corresponding to the rotations of the driving means, a third memory for storing data of inertia acting upon the carrier, and an arithmetic operator, whereby a driving quantity of the carrier is calculated on the basis of target data from the target setting means, the current position data of the carrier and the inertia data, the driving means being driven based on the data of the driving quantity so as to move the carrier toward the target, and the current position data is updated in accordance with the position taken by the carrier.

4,698,570

BOOM POSITIONING APPARATUS FOR ROCK DRILL

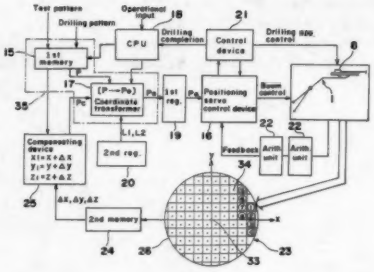
Osamu Satoh, Higashihiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 23, 1986, Ser. No. 854,916

Claims priority, application Japan, Apr. 30, 1985, 60-94350

Int. Cl.[4] G05B *19/10*

U.S. Cl. 318—568 **4 Claims**



1. A boom positioning apparatus for a rock drill, comprising:

a boom means which has a drilling apparatus mounted thereon;

an input means which determines, as set values expressed in a rectangular coordinate system, positions and directions of a number of drilling points formed on a drilling plane disposed immediately in front of a facing, a working area of said boom means being divided into a plurality of blocks such that the drilling points are, respectively, alloted to the blocks, said blocks being assigned block numbers;

a compensating means which adds compensation values to change the set values into compensated set values respectively such that actual drilling positions are located at normal positions of the drilling points, respectively, said compensating means receiving the set values of the drilling points from said input means and inputting the compensated set values back into said input means, said compensating means further receiving from said input means the block numbers corresponding respectively to the set values;

a memory means for storing the compensation values for the set values allotted to the blocks respectively such that said compensating means calls from said memory means the compensation values for the blocks, on the basis of the block numbers, corresponding to the set values inputted to said compensating means respectively;

positioning servo control means for displacing said boom means in accordance with the compensated set values from said input means;

a feedback means which detects displacement amounts of said boom means so as to feed back to said positioning servo control means signals indicative of the displacement amounts of said boom means respectively; and

a control device for controlling said drilling apparatus, which actuates said drilling apparatus in response to signals from said positioning servo control means.

4,698,571

POSITION CONTROL APPARATUS FOR AUTOMOBILE DRIVER

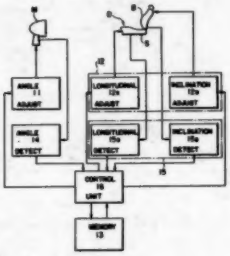
Ken Mizuta, Miyagi, and Shiro Kondo, Furukawa, both of Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Mar. 24, 1986, Ser. No. 843,123

Claims priority, application Japan, Mar. 23, 1985, 60-41025[U]

Int. Cl.[4] G05B *19/42*

U.S. Cl. 318—568 10 Claims



1. A position control apparatus for automatically adjusting parts of an automobile driver's environmental setting, including a rear view mirror and a driver's seat, in accordance with individual preferences of a particular driver, comprising:

position adjusting means including a longitudinal position adjusting means for adjusting the position of the driver's seat in a longitudinal direction and mirror angle adjusting means for adjusting the angle of the rear view mirror, said position adjusting means being coupled to said parts and being responsive to control signals from a control unit for adjusting each of said parts to a desired position;

said control unit, and memory means coupled to said control unit for storing driver's seat longitudinal position data and rear view mirror angle data therein;

manula operating means operatively coupled to said longitudinal position adjusting means and said mirror angle adjusting means for manually adjusting each of said parts to respective positions desired by a particular driver;

detecting means coupled to each of said parts and said control unit for detecting the actual positions of each of said parts and supplying actual position data thereon to said control unit;

memory setting means coupled to said control unit for instructing said control unit to store actual position data in said memory means corresponding to optimum actual positions for said driver's seat and rear view mirror manually adjusted by said manual operating means and detected by said detecting means; and

select means coupled to said control unit for instructing said control unit to select optimum position data stored in said memory means for a particular driver and to send control signals to said longitudinal position adjusting means and said mirror angle adjusting means for adjusting each of said parts to respective positions represented by said selected optimum position data.

4,698,572

KINEMATIC PARAMETER IDENTIFICATION FOR ROBOTIC MANIPULATORS

Henry W. Stone, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 4, 1986, Ser. No. 848,437

Int. Cl.[4] B25J *1/02;* G05B *1/06*

U.S. Cl. 318—568 6 Claims

1. A method of identifying kinematic parameters of an n-degree of freedom manipulator having n-links and n-joints labeled link i and joint i for i—1 . . . n, whereby the n^{th} link is the link of the manipulator distal from the manipulator's base, and wherein controlled movement of said joints defines a manipulator work envelope; said method comprising the steps of:

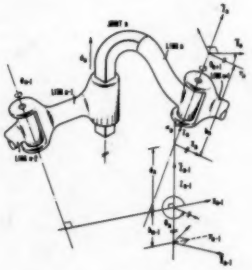
(A) defining a reference cartesian coordinate frame of a predefined working volume;

(B) positioning said manipulator base in a fixed location relative to said reference coordinate frame wherein said manipulator work envelope is within said reference coordinate frame predefined working volume;

(C) completing for each joint of the robot beginning with the n^{th} joint (i.e., i=n, until i=1) the following operations:

(a) defining a target relative to the i^{th} link whereby incremental movement of the i^{th} joint causes the synchronous movement of said target within said reference cartesian coordinate frame working volume;

(b) measuring a cartesian position of said target for each of a plurality of incremental movements of said i^{th} joint whereby the resultant locus of measured cartesian positions defines a circle centered about the axis of rotation on a plane perpendicular to the axis of rotation, for a revolute joint; and a line parallel to the axis of translation for a prismatic joint;



(c) defining said plane on which said circle lies from said measured cartesian positions and the direction of a vector normal to said plane, said vector being parallel to the joint axis of rotation, for a revolute joint;

(d) defining the center of said circle which lies on said axis of rotation from said measured cartesian positions, for a revolute joint;

(e) detecting the line parallel to the line of translation, from said measured positions, for a prismatic joint;

(f) establishing the cartesian position and orientation of a cartesian coordinate frame fixed relative to the $i-1^{th}$ link of the manipulator measured with respect to said reference coordinate frame based upon said center of said circle and vector normal for a revolute i^{th} joint, or line of translation for prismatic i^{th} joint.

4,698,573

NUMERICALLY CONTROLLED WORKING PROCESS

Tomomitsu Niwa, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1983, Ser. No. 541,210

Claims priority, application Japan, Oct. 12, 1982, 57-178708; Oct. 12, 1982, 57-178709

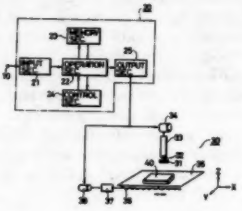
Int. Cl.[4] B23Q *15/10;* G05B *19/28*

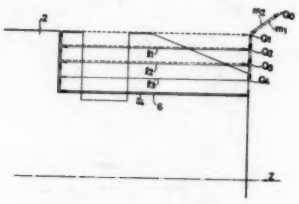
U.S. Cl. 318—571 5 Claims

1. A numerically controlled working process for performing the machining of a work, comprising the steps of:

(a) inputting to a numerically controlled working machine first data representative of the shape of said work before machining as a work shape, said work shape including a recess enclosed on both sides in a first direction;

(b) inputting to said machine second data representative of a desired finished shape of said work;
(c) causing said machine to determine a working path for said tool on the basis of said second data of said finished shape;
(d) causing said machine to compare the first data on said work shape with said working path to obtain the point or points of intersection therebetween;
(e) causing said machine to determine whether a working





start point is outside said work shape when said point or points of intersection exist;
(f) causing said machine to set a first tool feed speed for movement in said first direction at a high value when said working start point exists outside said work shape and to set the first tool feed speed to a low value when said working start point exists inside said work shape; and
(g) causing said machine to switch the tool feed speed alternatively between said high value and said low value every time said tool reaches each said point of intersection.

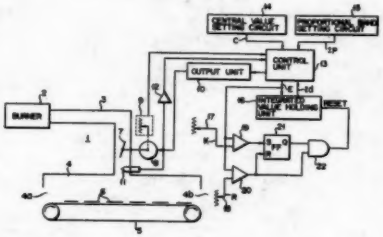
4,698,574

PROCESS CONTROL APPARATUS

Yasuo Yoshizawa, Yonezawa, and Masatoshi Jinno, Shiroishi, both of Japan, assignors to Yoshiki Industrial Co., Ltd., Yonezawa, Japan

PCT No. PCT/JP85/00126, § 371 Date Oct. 23, 1985, § 102(e) Date Oct. 23, 1985, PCT Pub. No. WO85/04267, PCT Pub. Date Sep. 26, 1985
PCT Filed Mar. 14, 1985, Ser. No. 800,118
Claims priority, application Japan, Mar. 14, 1984, 59-47231
Int. Cl.[4] G05B *11/36*
U.S. Cl. 318—609 **3 Claims**

1. A process control apparatus comprising:
means for setting a central value to which a controlled variable is to be approached;
means for setting a proportional band in which said central value is centered;
means for setting a first pair of preset values each being equally separated from said central value within said proportional band;
means for setting a second pair of preset values each being closer to the central value than the first pair of preset values and equally separated from said central value within said first pair of preset values;
means for obtaining error data representing a difference value between said central value and the controlled variable;
means for integrating said error data;
means for commencing the integrating means when the controlled variable reaches within said proportional band;
means for setting said integrating means in a reset enable state when said error data reaches at one of the first pair of



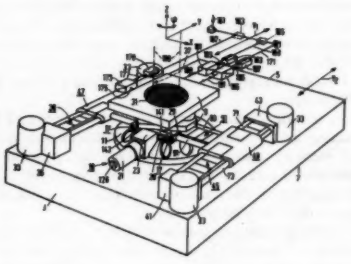
present values from outside of a range defined by the first pair of preset values;
means for resetting said integrating means when said error data reaches at one of the second pair of preset values when the reset enable state is set; and
means for starting an integral action of said integrating means when an integrated value is reset by said resetting means.

4,698,575

POSITIONING DEVICE

Adrianus G. Bouwer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 26, 1986, Ser. No. 878,740
Claims priority, application Netherlands, Apr. 29, 1986, 8601095
Int. Cl.[4] G05B *1/06*
U.S. Cl. 318—640 **6 Claims**



1. A positioning device comprising a first upper and a second lower support, which are coupled to each other by means of at least two elastic rods acting together as a parallelogram mechanism, at least one support being displaceable parallel to itself with respect to the other support in a direction-parallel to one (Y) of two coordinate directions (X,Y) of an orthogonal coordinate system (X,Y,Z) with a simultaneous elastic deformation of the rods acting as a parallelogram mechanism, which rods have a comparatively high resistance to displacement of one of the supports with respect to the other support parallel to the X-direction, characterized in that the second lower support is supported by means of a static bearing prestressed parallel to the Z-direction and comprising a viscous carrier medium and is guided with respect to a base and is provided with a Z-actuator which cooperates with the first upper support, the upper support being displaceable in a first mode of operation of the

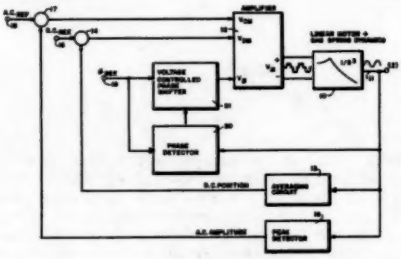
Z-actuator by means of a first and a second drive, which is independent from the first drive, respectively, parallel to the X-direction and the Y-direction to an X-Y target position with a Z-position an activated Z-actuator, while the upper support in a second mode of operation of the Z-actuator is displaceable parallel to the Z-direction and is maintained in the said X-Y target position by the first and second drives during a displacement parallel to the Y-direction of the lower support with respect to the upper support.

4,698,576

TRI-STATE SWITCHING CONTROLLER FOR RECIPROCATING LINEAR MOTORS

Robert L. Maresca, Ossining, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Filed Jun. 20, 1986, Ser. No. 876,544
Int. Cl.[4] G05B *11/00*
U.S. Cl. 318—687 **4 Claims**



1. A control system for a linear motor comprising:
a switching amplifier having first, second and third inputs and an output for supplying to the motor a drive signal having a tri-state switching waveform,
a first feedback control loop having an averaging circuit with an input which receives a motor position signal and an output for deriving a DC position signal,
first means for combining said DC position signal with a DC reference signal indicative of the desired motor position to produce a resultant error signal at an output of the first combining means,
means for coupling said first input of the switching amplifier to the output of the first combining means,
a second feedback control loop including a peak detector having an input which receives said motor position signal and an output for deriving an AC amplitude signal,
second means for combining said AC amplitude signal with an AC reference signal indicative of the desired stroke amplitude of the linear motor to produce a resultant error signal at an output thereof,
means for coupling said second input of the switching amplifier to the output of the second combining means,
a third feedback control loop including a phase locked loop circuit having a first input which receives the motor position signal and a second input for receiving a phase reference signal, and
means for coupling the third input of the switching amplifier to an output of the phase locked loop.

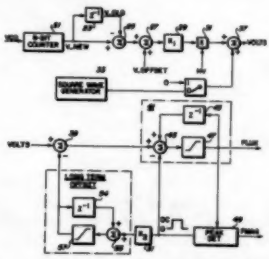
4,698,577

METHOD OF DIGITAL FLUX RECONSTRUCTION WITH DC ELIMINATION

Robert A. Seymour; Allen M. Ritter, both of Charlottesville, Va.; Richard A. Kellogg, Syracuse, N.Y., and John D. D'Atre, Earlysville, Va., assignors to General Electric Company, Charlottesville, Va.

Filed Jan. 16, 1986, Ser. No. 819,279
Int. Cl.[4] H02P *5/40*
U.S. Cl. 318—805 **9 Claims**

1. A method for eliminating direct current components of a flux vector signal representative of a rotating flux field in an alternating current polyphase dynamoelectric machine, the machine having at least one electrical power terminal for each phase, the method comprising the steps of:
measuring machine terminal voltage at each machine power terminal;
converting the measured machine terminal voltage to equivalent first and second two-phase voltage representative signals;
integrating each of the first and second signals for generating corresponding flux vector component representative signals, each of the flux vector representative signals varying sinusoidally;



detecting consecutive maximum and minimum peaks of each of the sinusoidal flux vector representative signals;
developing a signal representative of a direct current (DC) component of each of the flux vector representative signals by determination of a voltage midpoint between the detected consecutive maximum and minimum peaks; and
subtracting the corresponding direct current component signal from a respective one of each of the first and second signals for eliminating any direct current component in the flux vector signals.

4,698,578

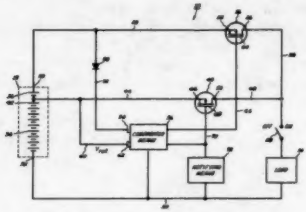
CIRCUIT FOR SUPPLYING ENERGY FROM A BATTERY TO AN ENERGY-USING DEVICE

Ferdinand H. Mullersman, Gainesville, Fla., and Mark E. McClelland, Alameda, Calif., assignors to Gates Energy Products, Denver, Colo.

Filed May 27, 1986, Ser. No. 866,675
Int. Cl.[4] H02J *7/00*
U.S. Cl. 320—13 **5 Claims**

1. A circuit for supplying energy to the load of an energy-using device having a minimum operating voltage below which said device is not fully operable, said circuit comprising:
a battery comprised of a plurality of electrochemical cells connected in series with respect to each other and with respect to said load, said plurality of cells comprised of a first portion of said plurality of cells and a second portion of said plurality of cells, each cell in said first portion having a deliverable energy capacity in excess of the deliverable energy capacity of each cell in said second portion, said circuit operable in a first mode to deliver energy to said load simultaneously from each cell in said plurality and operable in a second mode to deliver energy to said load from only said first portion of said plurality of cells; wherein the number of cells in said first portion is less than the number of cells in said second portion and the voltage delivered by said first portion of said plurality of cells is less than the voltage delivered by said second portion of said plurality of cells;
means disposed in said circuit for sensing a characteristic of said battery during said first mode of operation, said characteristic indicative of the energy remaining in said second portion of said plurality of cells during said first mode of operation; and

means for switching said circuit from said first mode to said second mode in response to said sensed characteristic indicating near depletion of deliverable energy from said second portion of said plurality of cells.



4,698,579

CHARGER FOR A BATTERY-OPERATED SURGICAL MACHINE

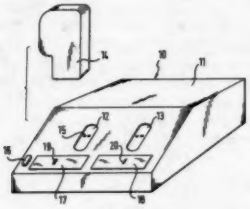
Karl M. Richter, Wendtorf, and Hans E. Harder, Probsteierhagen, both of Fed. Rep. of Germany, assignors to Howmedica International, Inc., Schoenkirchen, Fed. Rep. of Germany

Continuation of Ser. No. 630,472, Jul. 12, 1984, abandoned. This application Jul. 18, 1986, Ser. No. 888,103

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1983, 3325282

Int. Cl.[4] H02T *7/00*

U.S. Cl. 320—14 **4 Claims**



1. A charger for a battery-operated surgical machine comprising a charging circuit and a housing containing the charging circuit, with said housing being provided with at least one plug receptacle means for connection with the battery component of the surgical machine and said housing also being fitted with means connected to said charging circuit for activating said charging circuit, wherein when the charging circuit is activated by said activating means the charging circuit first discharges said battery component down to a predetermined lower potential, then charges it up to a predetermined higher potential, then discharges it again to said predetermined lower potential and finally charges in again to said predetermined higher potential,

with said charging circuit containing means for comparing the actual potential of the battery component with a standard potential at predetermined time intervals during both the discharging and charging phases of the second cycle of discharging and charging, and means for indicating when the difference between said actual and standard potentials attains a predetermined magnitude.

4,698,580

SIMPLE AUTOMATIC CHARGING OR CUTOFF CIRCUIT DEVICE FOR INTERMITTENT PULSATING D.C. CHARGING POWER SUPPLY

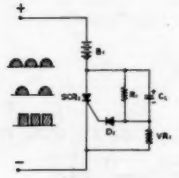
Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Jun. 12, 1985, Ser. No. 743,750

Int. Cl.[4] H02J *7/10*

U.S. Cl. 320—59 **7 Claims**

1. A battery charging circuit which automatically cuts off whenever a battery being charged becomes substantially fully charged, the circuit consisting of a source of pulsating d.c. charging current having a positive terminal and a negative terminal; an SCR having an anode electrode, a cathode electrode and a gate electrode; means for conductively connecting a battery to be charged between the positive terminal of the source of pulsating d.c. charging current and the anode electrode of the SCR, the cathode of the SCR being conductively connected to the negative terminal of the source of pulsating d.c. charging current; a first resistance across which a differentially shaped voltage of sufficient magnitude for triggering the SCR into its conductive state appears for each applied d.c. current pulse until a battery which is being recharged reaches substantially full charge and a capacitor connected in series



with one another in denominated order between the cathode electrode and the anode electrode of the SCR; a second resistance conductively connected across the capacitor providing a discharge path for the capacitor; and a diode having an anode electrode and a cathode electrode, the cathode electrode of the diode being conductively connected to the gate electrode of the SCR and the anode electrode of the SCR being conductively connected to a circuit point between the capacitor and the first resistance, whereby charging current pulses can be delivered to a battery being recharged until substantially full charge is reached, the differentially shaped voltage thereafter which appears across the first resistance being insufficient to fire the SCR so long as the battery remains at substantially full charge.

4,698,581

REACTIVE POWER COMPENSATION APPARATUS

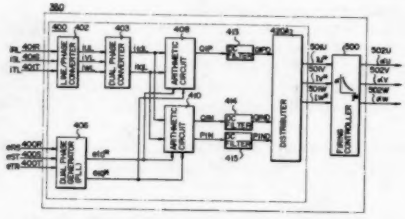
Takeo Shimamura; Hiroshi Uchino, both of Hachioji, and Ryoichi Kurosawa, Kokubunji, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 5, 1986, Ser. No. 903,957

Claims priority, application Japan, Sep. 10, 1985, 60-200010; Sep. 10, 1985, 60-200012

Int. Cl.[4] G05F *1/70*

U.S. Cl. 323—211 **10 Claims**



1. A reaction power compensation apparatus for compensating for reactive power generated by a load connected to a AC main line of an AC power supply system, comprising:

line/phase converter means for dual-converting load currents of said load into dual phase current signals;

dual phase generator means for generating unit dual phase voltage signals from AC main line voltages of the AC

main line connected to said load, said unit dual phase voltage signals being synchronized with the AC main line voltages;

first means, coupled to said line/phase converter means and to said dual phase generator means, for performing predetermined arithmetic operations on said dual phase current signals and said unit dual phase voltage signals, so that an in-phase reactive component signal and opposite phase component signals of said load currents are separately detected; and

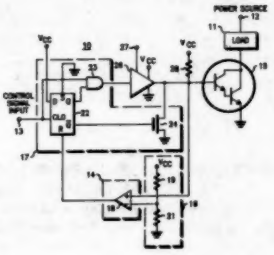
second means, coupled to said first means, for producing current commands based on said separately-detected in-phase and opposite phase signals, said current commands serving to control said reactive power compensation apparatus.

4,698,582

POWER DRIVER HAVING SHORT CIRCUIT PROTECTION

Jeffrey J. Braun, Chandler, Ariz., and Kenneth M. Cook, Palatine, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 23, 1986, Ser. No. 889,642
Int. Cl.[4] G05F *1/573*
U.S. Cl. 323—285 **12 Claims**



1. A power driver with short circuit protection comprising:

(a) control signal input means for receiving a control signal;

(b) power switch means responsive to said control signal for completing a current path through a load, said power switch means including a transistor having a base and an emitter;

(c) comparator means for comparing a reference signal with a sense signal, said sense signal being a function of base-emitter voltage for said transistor, and for providing a fault detected signal when said sense signal exceeds said reference signal; and

(d) disable means responsive to said fault detected signal for disabling said transistor.

4,698,583

METHOD OF MONITORING A HEATER FOR FAULTS

Chester L. Sandberg, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Mar. 26, 1985, Ser. No. 716,780
Int. Cl.[4] G01R *31/12*; H05B *1/02*; H02H *7/00*
U.S. Cl. 324—546 **7 Claims**

1. A method for monitoring the integrity of an elongate heater while it is connected to a power supply, and for reducing the power supplied to the heater if the heater incurs physical damage, which method comprises

(A) providing an elongate heater, which heater comprises

(a) an elongate heating member;

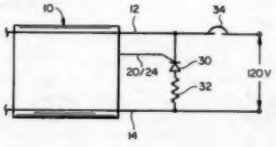
(b) an insulating jacket which encloses the heating member;

(c) a first electrically conductive member which surrounds the insulating jacket;

(d) a separating and insulating member which surrounds the first conductive member; and

(e) a second electrically conductive member which surrounds the first conductive member and is separated and insulated therefrom by the separating member;

(B) monitoring the impedance between the first and second electrically conductive members; and



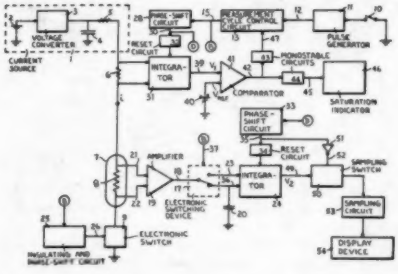
(C) providing means which reduces the power supplied available to the elongate heating member when if physical damage to the heater causes the impedance between the first and second electrically conductive members is to be less than a predetermined magnitude.

4,698,584

METHOD AND OHMMETER FOR MEASURING VERY LOW ELECTRIC RESISTANCES

Francois Morin, Longueuil, Canada, assignor to Hydro Quebec, Montreal, Canada

Filed Oct. 22, 1985, Ser. No. 790,121
Claims priority, application Canada, Jun. 25, 1985, 485,172
Int. Cl.[4] G01R *27/16*; B23K *11/24*
U.S. Cl. 324—62 **23 Claims**



1. An ohmmeter for measuring a very low electric resistance, comprising:

a source of electric energy for delivering a one-polarity measuring current flowing through an electrically conducting object presenting said very low resistance so as to create a voltage drop proportional both to the magnitude of the measuring current and to said very low electric resistance;

means for detecting said measuring current and for producing a signal representative of the magnitude of said measuring current;

first integration means for integrating with respect to time and from a given instant the signal representative of the magnitude of the measuring current in order to produce a first integration signal representative of the quantity of measuring current which has flowed through the electrically conducting object from said instant;

means for generating an interruption signal when said first integration signal reaches a predetermined amplitude, that is, when a predetermined quantity of measuring current

has flowed through the electrically conducting object from said instant;

second integration means for integrating with respect to time said voltage drop proportional to the magnitude of the measuring current and to said very low electric resistance in order to produce a second integration signal;

means for controlling said first and second integration means so as to simultaneously start the integration of the signal representative of the magnitude of the measuring current carried out by the first integration means and the integration of said voltage drop carried out by the second integration means; and

means for stopping the integration of said voltage drop carried out by the second integration means in response to said interruption signal;

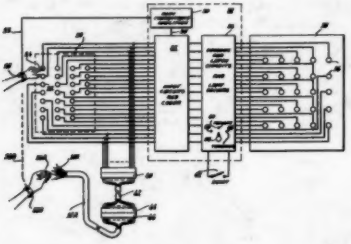
the second integration signal having upon stopping of the integration of said voltage drop carried out by the second integration means an amplitude which is related to said predetermined quantity of measuring current and which constitutes a measure of said very low electric resistance.

4,698,585

APPARATUS FOR IDENTIFYING THE CONNECTION POSITION OF A WIRE HAVING TWO MODES OF OPERATION

John Herman, Bethel, and George Chirico, Huntington, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Sep. 15, 1980, Ser. No. 187,013
Int. Cl.[4] G01R *19/00*
U.S. Cl. 324—66 **1 Claim**



1. A wire position indicator operable in a first mode for correlating the identification of individual color coded wire ends of a cable to be connected to individual connection elements of a mating part of a cable end connector and in a second mode for connecting indivdual wire ends of a cable to be connected to individual connection elements of a mating part of a cable end connector the other end of which has already been permanently wired to a cable end connector part, said wire position indicator comprising, in combination:

a fixture for holding the one of the mating parts of the cable end connector which is to be wired; said fixture including a number of indicating elements corresponding to the number of connection elements of the connector part to be wired; each of said indicating elements being positioned to identify a particular connection element;

a plurality of light sources corresponding in number to least the number of said indicating elements; said light sources being arranged in a predetermined pattern and substantially in a common plane;

said fixture comprising a supporting panel including said indicating elements and a bottom plate attached to said supporting panel by means of intervening supporting elements; said bottom plate of said fixture including cup means for each of said light sources for confining the light from each of said light sources; said cup means for each of said light sources comprising an opening in the bottom of said bottom plate; said bottom plate including a smaller opening extending through from the upper surface of said bottom plate to each of said cup means openings; said smaller openings comprising the means for inter-connecting said fiber-optic cables to said cup means; said fiber-optic cables being respectively connected from said light source cup means at said bottom plate to said indicating elements at said supporting panel;

a plurality of electrical elements each respectively identifying a particular wire to be assembled into a particular connection element of the connector part; means for making an electrical connection to said electrical elements one element at a time to identify a wire to be assembled, each of said means for making an electrical connection to an electrical element identifying a particular wire to be assembled comprising a switch having a wire identifying indicia associated therewith to identify the particular wire served by each switch;

electrical driving means connected to respond to said electrical connection means for energizing the one of said light sources corresponding to the connection element to which said wire is to be assembled;

a first mating part of a cable end connector which is wired to said electrical driving means and which is operable to receive the wired mating part of a cable end connector to which the cable in process is already wired to thereby establish connections to the individual wires to be assembled; and

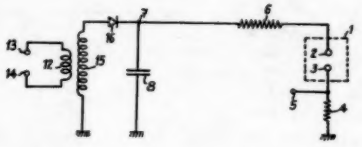
a probe for making an electrical connection to a selected wire which is to be assembled to thereby complete the circuit to said electrical driving means.

4,698,586

ELECTRIC PARTICLE DETECTOR FOR THE DETECTION OF FIRE

Andre Roos, Bonnieres; Daniel Dutertre-Laduree, Bonnieres/-Siene; Max Goldman, and Alice Goldman, both of Gif-sur-Yvette, all of France, assignors to PGEP Professional General Electric Corp., France

PCT No. PCT/FR85/00060, § 371 Date Jan. 27, 1986, § 102(e) Date Jan. 27, 1986, PCT Pub. No. WO85/04483, PCT Pub. Date Oct. 10, 1985
PCT Filed Mar. 25, 1985, Ser. No. 807,879
Claims priority, application France, Mar. 26, 1984, 84 04645
Int. Cl.[4] G01N *27/00*
U.S. Cl. 324—71.1 **6 Claims**



1. An electric particle detector, which comprises:

a sensor (1) for detecting the presence of charged particles in the vicinity of the detector, the sensor having a pair of spaced apart first and second electrodes (2, 3), each of the first and second electrodes having the shape of the Greek symbol alpha (α) to limit the electric field between the first and second electrodes and to minimize electrical discharge therebetween; and

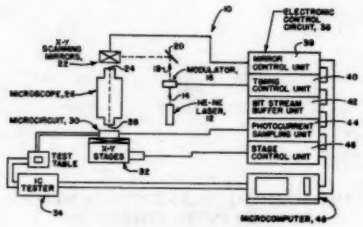
means for providing an operating current to the sensor of between about 10^{-9} amperes and about 10^{-13} amperes, said current being below the current necessary for self-sustained avalanche, wherein the presence of charged particles causes the current through the sensor to increase.

4,698,587

METHOD OF CHARACTERIZING CRITICAL TIMING PATHS AND ANALYZING TIMING RELATED FAILURE MODES IN VERY LARGE SCALE INTEGRATED CIRCUITS

Daniel J. Burns; Charles A. Eldering, both of Rome, and Mark T. Pronobis, Lee, all of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 28, 1985, Ser. No. 716,863
Int. Cl.[4] G01R *31/28;* G01N *23/00*
U.S. Cl. 324—73 R **19 Claims**



1. A method of characterizing critical timing paths and analyzing timing related failure modes in an integrated circuit by ascertaining the timing margin of a transistor of said integrated circuit, said method comprising the steps of:

(a) focusing and preselectively applying a beam of electromagnetic radiation of preselected intensity onto a particular spot on said transistor of said integrated circuit;

(b) functionally testing said transistor a first time to determine the ON or OFF state of said transistor during each clock period of said transistor;

(c) storing information on said ON or OFF state of said transistor for each of said clock periods of said transistor;

(d) functionally testing said transistor a second time with said beam of electromagnetic radiation being applied to said particular spot on said transistor only when said transistor will be in said OFF state during the next clock period as determined from stored information;

(e) determining the time required for said transistor to reach said OFF state;

(f) analyzing said determined time required for said transistor to reach said OFF state in order to ascertain said timing margin of said transistor; and

(g) utilizing said timing margin in order to analyze the operation of said integrated circuit.

4,698,588

TRANSPARENT SHIFT REGISTER LATCH FOR ISOLATING PERIPHERAL PORTS DURING SCAN TESTING OF A LOGIC CIRCUIT

Yin-Chao Hwang, Sugar Land, and Theo J. Powell, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 23, 1985, Ser. No. 790,598
Int. Cl.[4] G01R *31/28;* G06F *11/00*
U.S. Cl. 324—73 R **11 Claims**

1. A scan register latch for facilitating testability of functional logic circuitry, comprising:

a latch for storing data;

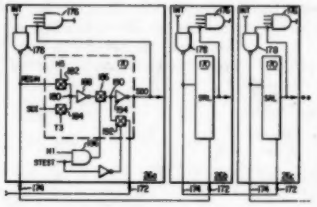
a scan data input node for receiving test data;

a scan data input gate connected between said latch and said scan data input node, and controlled by a scan clock signal so that test data presented to said scan data input node is loaded into said latch responsive to said scan clock signal;

an output node;

an isolation gate connected between said latch and said output node, and controlled by a test mode signal having a first logic state and a second logic state, so that said latch is coupled to said output node responsive to said test mode signal being in its first logic state;

an operating data input node for receiving data from a predetermined point in said functional logic circuitry; and



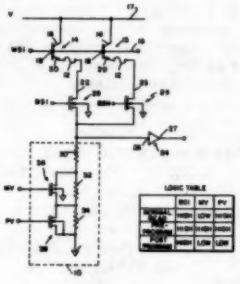
a bypass gate, connected between said operating data input node and said output node, and controlled by said test mode signal so that said operating data input node is coupled to said output node responsive to said test mode signal being in its second logic state.

4,698,589

TEST CIRCUITRY FOR TESTING FUSE LINK PROGRAMMABLE MEMORY DEVICES

Timothy L. Blankenship, Palm Bay, Fla., and Joseph G. Nolan, III, San Jose, Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Mar. 21, 1986, Ser. No. 842,267
Int. Cl.[4] G01R *31/02*
U.S. Cl. 324—158 R **22 Claims**



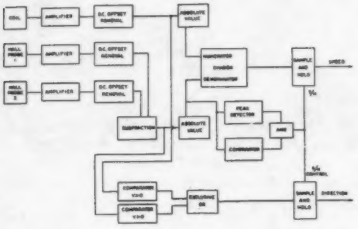
1. A testing circuit for determining the proper functioning of a programmable element in a memory device having a sensing means connected to said programmable element for providing a first signal when a current flowing through said programmable element is below a specified threshold and a second signal when said current flow is above said specified threshold, said testing circuit comprising:

a variable resistance means forming a voltage divider with said programmable element, said sensing means being connected at a nodal point therebetween, said variable resistance means providing a first resistance during a normal read operation of said memory device and a second resistance during a testing operation of said memory device for varying said current flow, whereby current flowing through said programmable element is sensed during said operations by said sensing means.

4,698,590
METHOD AND APPARATUS FOR MEASURING VELOCITY OF FERROMAGNETIC TUBING

Gordon L. Moake, and Marvin Milewits, both of Houston, Tex., assignors to PA Incorporated, Houston, Tex.

Continuation of Ser. No. 599,227, Apr. 11, 1984, Pat. No. 4,578,642. This application Mar. 24, 1986, Ser. No. 843,046
The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.
Int. Cl.[4] G01P *3/48;* **G01N** *27/82;* **E21B** *47/00*
U.S. Cl. 324—160 **11 Claims**



1. A method of measuring the axial velocity of a relatively moving ferromagnetic element, comprising:

applying a uniform magnetic field to a portion of the element;

producing a first signal dependent upon the axial velocity of the element relative to the uniform magnetic field and upon magnetic leakage field emanating from the element as a result of axial changes in the magnetic properties of the element;

producing a second signal dependent upon the magnetic leakage fields emanating from the element as a result of axial changes in the magnetic properties of the element and at least substantially insensitive to the axial velocity of the element relative to the uniform magnetic field;

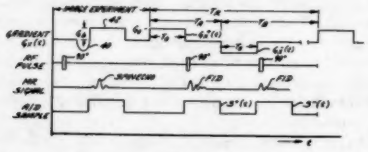
substantially simultaneoulsy producing the first and second signals by a plurality of sensors each providing a voltage output functionally related to magnetic flux leakage density of the magnetic leakage fields; and

comparing the first and second signals to measure the axial velocity of the tubular element.

4,698,591
METHOD FOR MAGNETIC FIELD GRADIENT EDDY CURRENT COMPENSATION

Gary H. Glover, Delafield, and Norbert J. Pelc, Wauwatosa, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Jan. 3, 1986, Ser. No. 816,074
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—307 **4 Claims**



1. A method for magnetic field gradient coil compensation comprising the steps of:

(a) positioning an NMR-active sample within a polarizing magnetic field and away from the isocenter of an MR scanner apparatus;

(b) applying along at least one axis of said MR scanner apparatus a gradient pulse;

(c) irradiating said sample with an RF excitation pulse within a predetermined time following application of said gradient pulse so as to generate an NMR signal;

(d) measuring and storing as data the phase of said NMR signal with respect to a reference phase and as a function of the total time since the application of said gradient pulse;

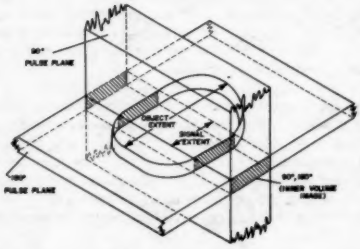
(e) calculating the impulse response to said gradient pulse using the stored phase data and storing the same as data; and

(f) calculating the values of a compensation circuit which is employed with the gradient coil using the stored impulse response data.

4,698,592
MRI OF CHEMICAL SHIFT SPECTRA WITHIN LIMITED INNER VOLUME

David A. Feinberg, Berkeley, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 16, 1985, Ser. No. 766,401
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **8 Claims**



1. A method for obtaining NMR chemical-shift spectral images of an inner-volume of an object, said method comprising the steps of:

(a) eliciting an NMR spin echo response from said inner-volume by imposing multiple RF nutation pulses, each in the presence of selective fixed magnitude magnetic gradients effectively limiting NMR excitations so as to nutate nuclei only in respective subvolumes of the object, which subvolumes intersect and define said inner-volume by their intersection, such that said spin echo response emanates only from said inner-volume;

(b) during successive repetitions of step (a), imposing predetermined different degrees of phase-encoding magnetic gradients directed along at least two different spatial dimensions and at times when said selective gradients are turned off;

(c) recording digital data representing said spin echo responses which occur in the absence of any imposed magnetic gradient; and

(d) performing an at least three-dimensional Fourier transformation by digital data processing of the recorded spin echo responses to provide digital data representing an NMR chemical shift spectrum for each of a plurality of arrayed contiguous image volume elements of said inner-volume of the object.

4,698,593

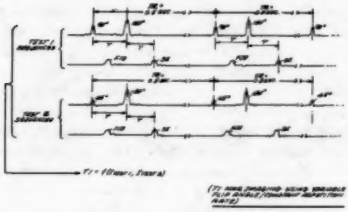
APPARATUS AND METHOD FOR T1 NMR IMAGING USING SPIN ECHO NMR RESPONSES ELICITED BY INITIAL EXCITATION PULSES OF DIFFERING NUTATION VALUES

Lawrence E. Crooks, Richmond, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Sep. 30, 1985, Ser. No. 781,736

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **22 Claims**



9. In an imaging NMR scanner of the type which includes means which repetitively tests selected internal regions of an object by transmitting an initial NMR r.f. nutation pulse followed by at least one 180° NMR r.f. nutation pulse so as to elicit at least one NMR spin echo signal from a selected region during each of successive NMR measurement cycles, the improvement comprising:

control means for causing said initial NMR r.f. nutation pulse to produce a first nutation angle ϕ_1 during at least one first NMR measurement cycle and to produce a different second nutation angle ϕ_2 during at least one other second NMR measurement cycle.

4,698,594

METHOD FOR RECORDING NUCLEAR RESONANCE SIGNALS

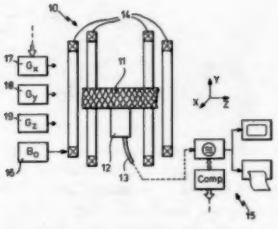
Heinz Zeiger, Waldbronn, and Günther R. Laukien, Rheinstetten, both of Fed. Rep. of Germany, assignors to Bruker Medizintechnik GmbH, Rheinstetten-Forchheim, Fed. Rep. of Germany

Filed May 14, 1986, Ser. No. 863,127

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517812

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **10 Claims**



1. A method for recording nuclear magnetic resonance signals in defined areas of a sample body comprising the steps of:

exposing said area to a constant magnetic field B_O generated along a first axis;

applying in a direction perpendicular to said first axis a measuring head on a surface of said sample body adjacent said area, said measuring head comprising an RF transceiver unit having a helical line with two ends and further having a shielding being arranged coaxially to said helical line and open at a radial end plane thereof, said helical line being free from connections on one of the said ends, the other of the said ends being arranged as an uppermost winding of said helical line, said winding being electrically connected to said shielding via a connection arranged in said radial end plane, wherein said measuring head is applied on said surface in said radial end plane;

varying the amplitude of an RF current supplied to a transmitter coil arranged coaxially to said measuring head to generate image planes of predetermined constant magnetic RF field strength B at a defined distance d above said radial end plane;

gating said RF current to induce pulsed nuclear magentic resonance transitions for a predetermined kind of nuclei with respect to the strength of the constant magnetic field B_0;

generating an image of the two-dimensional distribution of said induced nuclear magnetic transitions within one of the said image planes.

4,698,595

NMR-APPARATUS WITH AN ADJUSTABLE RF TUNING CIRCUIT

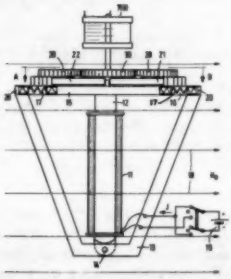
Peter Röschmann, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 17, 1985, Ser. No. 735,006

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1984, 3421830

Int. Cl.[4] G01R *33/08*

U.S. Cl. 324—313 **8 Claims**



1. An NMR apparatus comprising means for generating a steady, uniform main magnetic field, means for generating an RF magnetic field which is oriented substantially perpendicularly to said main magnetic field, means for tuning or matching said RF field generating means to an RF generator, said tuning or matching means including an electrical circuit having at least one adjustable element and means for adjusting said adjustable element, said adjusting means comprising a movably supported coil disposed in said main magnetic field, means for supplying at least one current pulse of one polarity or the other polarity to said coil so as to deflect said coil out of a rest position in one direction or the other direction in dependance on the polarity of said at least one pulse and means, coupled to said coil and said adjustable element, for converting said deflection of said coil into a stepwise movement of said adjustable element, said stepwise movement having a direction which corresponds to the direction of said deflection of said coil.

4,698,596
SWITCHED CAPACITOR SWITCHING

David G. Haigh, London, and Bhajan Singh, Birmingham, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

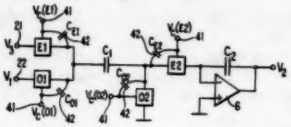
PCT No. PCT/GB83/00203, § 371 Date May 7, 1984, § 102(e) Date May 7, 1984, PCT Pub. No. WO84/01065, PCT Pub. Date Mar. 15, 1984

PCT Filed Aug. 12, 1983, Ser. No. 610,303

Claims priority, application United Kingdom, Sep. 7, 1982, 8225474

Int. Cl.[4] G06G 7/18; H03K 5/00

U.S. Cl. 328—127 7 Claims



1. A switched capacitor parasitic insensitive integrator having at least one pair of input terminals and an output terminal and comprising:

amplifier having an input and an output terminal, the amplifier output terminal being connected to the integrator output terminal;

a first set of even and odd switches, E2 and O2, connected respectively in series between the amplifier input terminal and a reference voltage level;

an integrating capacitor connected between the amplifier input terminal and the amplifier output terminal;

at least one second set of even and odd switches, E1 and O1, connected in series between respective terminals of said at least one pair of input terminals of the integrator;

at least one switched capacitor connected between the interconnection point of said E2 and O2 switches and the respective interconnection point of said E1 and O1 switches; and

clock means for producing four periodic switching signals, with each signal having the same periodicity and a respective switching signal being connected to each of the four switches, E2, O2, E1 and O1, and for outputting said periodic switching signals such that E2 opens before E1, O2 opens before O1, E1 is not closed when O1 is closed and E2 is not closed when O2 is closed.

4,698,597
SUPPRESSED-FUNDAMENTAL FREQUENCY THREE-WAY PREDISTORTER

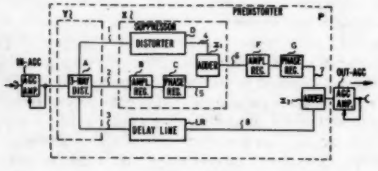
Gabriele Merli, and Termano Testi, both of Milan, Italy, assignors to GTE Telecommunicazioni S.p.A., Milan, Italy

Filed Sep. 5, 1985, Ser. No. 773,689

Claims priority, application Italy, Oct. 31, 1984, 23409 A/84

Int. Cl.[4] H04B 1/00; H03B 1/00

U.S. Cl. 328—163 6 Claims



1. A suppressed-fundamental frequency predistorter, characterized in that it is provided with means adapted to fully isolate any distortion products included in an in-coming signal connected to said predistorter and means adapted to regulate the distortion products comprising:

a three-way distributor circuit which distributes the input signal on first, second and third outputs, a distortion and fundamental suppression unit connected to said first and second outputs of the distributor circuit and comprising a distorter circuit connected to said first output, which generates distortion products, in addition to the fundamental coming from said first output of the distributor, a first amplitude regulator, and a first phase regulator connected to said second output and a first adder circuit connected to said distorter circuit and to said first phase regulator for adding signals from said distorter and said first phase regulator, with opposite phases, the distortion and fundamental suppression unit including an output and operated to isolate at said output the distortion products alone, a second amplitude regulator and a second phase regulator connected to said first adder circuit, operated to regulate the amplitude and phase of the isolated distortion products alone, a delay line connected to said distributor circuit third output acting to delay the fundamental coming from said third output of the distributor, and a second adder circuit connected to said second phase regulator and to said delay line operated to add the distortion products alone regulated by said second amplitude regulator and said second phase regulator, to the fundamental coming from the delay line, whereby the desired linearizing signal is generated.

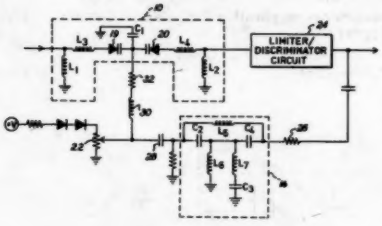
4,698,598
FM DEMODULATOR SYSTEM WITH THRESHOLD EXTENSION

Joseph G. Mobley, Dunwoody, and David P. Womble, Doraville, both of Ga., assignors to Scientific Atlanta, Inc., Atlanta, Ga.

Filed Aug. 4, 1986, Ser. No. 892,970

Int. Cl.[4] H03D 3/00; H04B 1/10

U.S. Cl. 329—134 7 Claims



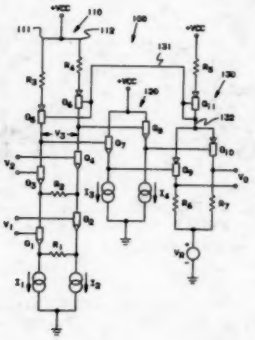
1. A system for demodulating FM signals and providing threshold extension which comprises means for band pass filtering input FM signals to be demodulated and providing output FM signals, said band pass filtering means including means for modulating the phase of said input FM signals in accordance with a steering signal to generate FM sidebands and to provide output signals from said band pass filtering means, the phase of which tracks the phase of said input FM signals, means including an FM discriminator for demodulating said output FM signals to provide demodulated signals, and means responsive to said demodulated signals for providing a signal which tracks the phase of the input FM signals over their entire band width for applying said phase tracking signal to said filtering means as said steering signal.

4,698,599

DIFFERENTIAL SUMMING AMPLIFIER FOR INPUTS HAVING LARGE COMMON MODE SIGNALS

Robert L. Hedman, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 11, 1986, Ser. No. 873,228
Int. Cl.[4] H03F 3/45
U.S. Cl. 330—252 9 Claims



1. A summing amplifier for summing multiple differential input voltages having different common-mode voltages, said amplifier having an input stage comprising:

a pair of supply voltages;

first and second branches in parallel between said supply voltages, each of said branches having in series

a current source,

a first input transistor having an input terminal coupled to a first of said input voltages,

a second input transistor having an input terminal coupled to a second of said input voltages,

first current-transfer means coupled to said first input transistor in each of said branches for transferring from one of said branches to the other of said branches a current whose magnitude is proportional to said first input voltage;

second current-transfer means coupled to said second input transistor in each of said branches for transferring from one of said branches to the other of said branches a current whose magnitude is proportional to said second input voltage;

load means for producing a sum signal whose magnitude is related to the difference between first and second branch currents flowing in said first and second branches respectively.

4,698,600

CLOCK PHASE DISCRIMINATOR

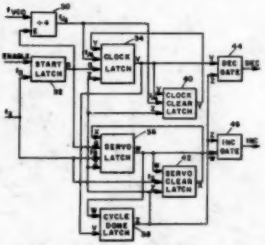
Dale B. Chapman, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 698,117, Feb. 4, 1985, abandoned. This application Feb. 24, 1986, Ser. No. 834,104
Int. Cl.[4] H03L 7/00
U.S. Cl. 331—1 A 11 Claims

1. A phase discriminator, responsive to the difference in phase between an input clock signal and a variable-frequency reference clock signal, for producing phase correction signals that are used to change the frequency of said reference clock signal, comprising:

means responsive to an input clock signal for producing a start cycle signal;

latch circuit means, responsive to a transistion of a reference clock signal following said start cycle signal and to an input clock signal transistion following said start cycle signal for measuring a phase difference between said input and reference clock signals by producing and changing variable signals defining a multi-state transition cycle, in which each state transition results from the change of a single respective variable signal, and for producing phase difference signals indicative of the measured phase difference; and



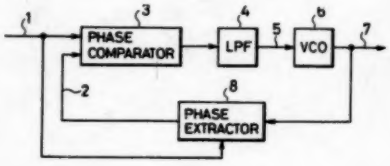
gate means responsive to said phase difference signals for producing a phase correction signal to change the frequency of said reference clock signal to a frequency that reduces said phase difference.

4,698,601

PHASE LOCKED LOOP

Iwao Aizawa, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 6, 1986, Ser. No. 826,675
Claims priority, application Japan, Feb. 20, 1985, 60-30330
Int. Cl.[4] H03L 7/06; H04N 5/04
U.S. Cl. 331—1 A 14 Claims



1. An oscillating circuit which includes a voltage controlled oscillator (VCO) generating an output of a frequency Nfo (N: an integer, fo: a frequency of a reference signal), comprising:

means for selectively phase-extracting one predetermined oscillating phase of the output of the VCO which appears nearest a predetermined phase of the reference signal every repeated period of the reference signal,

means for phase-comparing said extracted oscillating phase with said predetermined phase of the reference signal to generate a phase error signal, and

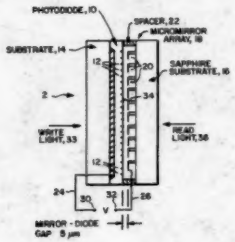
means for producing a control signal for the VCO based on said phase error signal generated from said phase-comparing means.

4,698,602

MICROMIRROR SPATIAL LIGHT MODULATOR

David Armitage, Los Altos, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 9, 1985, Ser. No. 785,691
Int. Cl.[4] G02F 1/015
U.S. Cl. 332—7.51 4 Claims



1. A micromirror spatial light modulator comprising

a micromirror array formed on a substrate and having a two dimensional configuration of electrostatically deflectable micromirror elements;

a silicon photodiode having a charge retaining grid formed on a surface thereof;

means for positioning said micromirror array within ten microns from said charge retaining grid;

means for applying a voltage between said photodiode and said micromirror array;

a metallic screen grid positioned between said silicon photodiode and said micromirror array and electrically isolated from said surface of said silicon photodiode by a layer of silicon dioxide; and

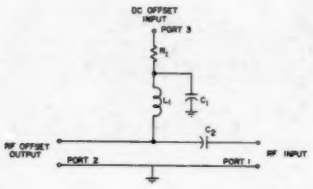
means for selectively applying a voltage to said metallic screen grid.

4,698,603

RF AMPLITUDE MODULATOR/MIXER

George A. Clarius, Smithtown, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 5, 1986, Ser. No. 859,486
Int. Cl.[4] H03C 1/00
U.S. Cl. 332—31 R 11 Claims



1. A method of facilitating amplitude modulation of a high frequency, low power carrier signal applied to a dual balanced modulator comprising:

(a) providing a high frequency modulating signal to a first input of an offset circuit, said offset circuit being connectable to a first input to a dual balanced modulator;

(b) providing a DC bias signal to a second input to the offset circuit;

(c) offsetting the DC level of the modulating signal to an offset level responsive to the DC bias signal; and

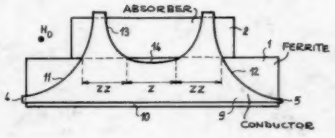
(d) adjusting the amplitude of the DC bias signal to a DC level corresponding to a desired percent modulation of the carrier signal output from the dual balanced modulator.

4,698,604

NONRECIPROCAL MICROWAVE DEVICE FOR SURFACE WAVES AND AN ISOLATOR HAVING HIGH ISOLATION FOR THE UTILIZATION OF SAID DEVICE

Gérard Forterre, Colombes, and Bernard Guerin, Paris, both of France, assignors to Thomson-CSF, Paris, France

Filed Dec. 24, 1985, Ser. No. 813,002
Claims priority, application France, Dec. 27, 1984, 84 19923
Int. Cl.[4] H01P 1/37
U.S. Cl. 333—24.2 7 Claims



1. A nonreciprocal microwave device for surface electromagnetic waves (SEW) comprising the following components included in a magnetic field (H_0):

at least two parallel plates of gyromagnetic material in which the surface waves propagate;

at least two parallel plates adjacent said gyromagnetic material forming aborsption loads for the electromagnetic waves;

a flat conductor or core placed between the gyromagnetic plates and between the absorption loads, the function of said flay conductor being to convert a volume wave (TEM wave) which is present at the input of the device to a surface wave and to convert the surface wave to a volume wave at the output of the device,

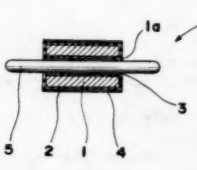
wherein, in order to absorb the parasitic volume waves generated by resonance and to prevent resonance of waves of higher modes, the core is deeply recessed to form a curvilinear edge, on its portion placed between the absorption loads, the depth of the curve being such that a portion of the curvilinear edge is located between the two gyromagnetic plates, forming at least one zone for a strong coupling between the parasitic volume waves and the SEW mode of surface waves to convert the energy of the parasitic waves into surface waves which propagate in reverse directions opposite to the direction of low-loss propagation.

4,698,605

MONOLITHIC LC FEED-THROUGH FILTER HAVING A FERRITE BODY WITH A RE-OXIDIZED CAPACITIVE LAYER

Eiji Imamura, Ishikawa; Takashi Kumokawa, Yokaichi; Fumio Nakayama, Kyoto; Haruhumi Mandai, Takatsuki; Iwao Fukutani, Nagaokakyo, and Kunisaburo Tomono, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Continuation of Ser. No. 547,781, Nov. 2, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 830,909
Claims priority, application Japan, Nov. 4, 1982, 57-194169
Int. Cl.[4] H03H 7/01
U.S. Cl. 333—184 6 Claims



1. An LC filter consisting essentially of a cylindrical ferrite

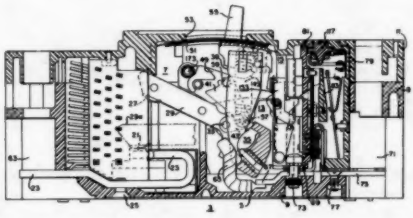
body of semi-conductor material having an axial bore extending through a central portion thereof, a ferrite oxidation formed insulating layer disposed on the outer peripheral surface of the ferrite member, an electrode disposed on the insulating layer which is located on the outer peripheral surface of said ferrite member, and a through-connector disposed in said axial bore of said cylindrical ferrite member electrically coupled with said cylindrical ferrite member.

4,698,606

CIRCUIT BREAKER WITH ADJUSTABLE THERMAL TRIP UNIT

Stephen A. Mrenna, Brighton Township, Beaver County, and Michael J. Whipple, New Sewickley, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 20, 1986, Ser. No. 876,557
Int. Cl.[4] H01H *75/08, 77/04*
U.S. Cl. 335—45 **9 Claims**



1. A multi-pole circuit breaker comprising:
a circuit breaker structure having a plurality of pole units;
each pole unit comprising a pair of separable contacts;
releasable means including a releasable arm to effect simultaneous opening of all of said pairs of contacts;
trip means for each of the pole units, each trip means having a bimetal element responsive to the occurrence of overload current conditions to effect release of the releasable means;
the trip means also comprising at least one integral a trip bar that is movable perpendicularly of the bimetal elements;
the trip bar including a ramp having a surface facing and spaced from each bimetal element which surface is inclined at an angle to the perpendicular axis of the trip bar;
the trip bar being rotated to a tripped position when at least one of the bimetal elements moves against a corresponding ramp surface; and
adjusting means associated with the trip bar for adjustably moving the trip bar perpendicularly to a position corresponding to the desired thermal rating spacing, whereby the perpendicular position of the trip bar establishes the thermal rating spacing.

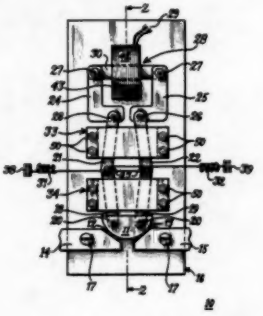
4,698,607

HIGH SPEED CONTACT DRIVER FOR CIRCUIT INTERRUPTION DEVICE

Edward K. Howell, Simsbury, Conn., assignor to General Electric Company, New York, N.Y.

Filed Oct. 16, 1986, Ser. No. 919,415
Int. Cl.[4] H01H *53/00*
U.S. Cl. 335—195 **19 Claims**

1. A contact driver comprising:
a bridging contact arranged across a pair of fixed contacts to allow electric current transport between said fixed contacts;
a first pair of conductor links pivotally attached at one end to said bridging contact and a second pair of conductor links pivotally attached at one end to said first conductor links and at their opposite ends to a pair of fixed conductors;
a first and a second spring, said first spring connected to one of said first and second conductor links and said second spring connected to the other of said first and second conductor links to hold said bridging contact in electrical connection between said pair of fixed contacts; and



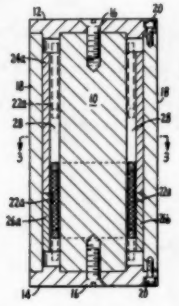
means for applying a current pulse to said fixed conductors and electromagnetically repelling said first and second pair of conductor links and lifting said bridging contact out of electrical circuit relation with said fixed contacts.

4,698,608

VARIABLE FORCE LINEAR ACTUATOR

Jack Kimble, Rancho Santa Fe, Calif., assignor to BEI Electronics, Inc., San Francisco, Calif.

Filed Apr. 29, 1986, Ser. No. 857,641
Int. Cl.[4] H01F *7/08*
U.S. Cl. 335—222 **30 Claims**



1. An electromechanical actuator comprising:
magnet means for producing a magnetic flux along an actuator stroke path, said magnetic flux having a first flux density at a first region along said stroke path and a second flux density, substantially different from said first flux density, at a second region along said stroke path, said magnet means including a first permanent magnet disposed along said first stroke path region and a second permanent magnet disposed along said second stroke path region; and
a coil assembly moveable along said stroke path, said assembly including a coil having at least one electrical conductor present in said magnetic flux.

4,698,609

MAGNETIC TRIPPING DEVICE

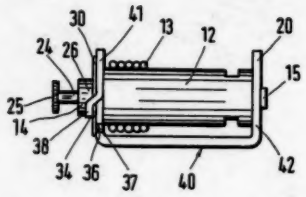
Rolf Goehle, Leimen; Volker Schmitt, Bammental; Werner Bruckner, Walldorf, and Klaus Greefe, Heidelberg, all of Fed. Rep. of Germany, assignors to Brown, Boveri & CIE AG, Mannheim, Fed. Rep. of Germany

Filed Apr. 30, 1986, Ser. No. 858,210

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515530

Int. Cl.[4] H01F 7/08

U.S. Cl. 335—255 11 Claims



1. Magnetic tripping device for an electrical wiring device, comprising a U-shaped magnetic yoke, a cylindrical non-magnetic coil form having two end surfaces and a periphery and being disposed in said magnetic yoke, a magnetic core disposed in said coil form, a magnetic armature movably disposed in said coil form with a sliding fit, and a compression spring disposed in said coil form between said magnetic core and said magnetic armature, said coil form having means in the form of at least two radial embossings uniformly distributed over said periphery in the vicinity of said end surfaces for fixing said magnetic core in place in said coil form and for guiding said magnetic armature in said coil form with a limited stroke, said compression spring having a given positioning force acting on said magnetic armature for a tripping current intensity of a given magnitude, and including a pressure washer disposed outside said coil form and locked to said magnetic yoke for absorbing part of said positioning force and conducting forces transmitted by said magnetic armature to said magnetic yoke.

4,698,610

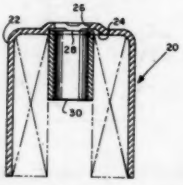
COIL FRAME ASSEMBLY AND THE METHOD OF MAKING SAME

James M. Pick, Elk Grove, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 1, 1986, Ser. No. 858,483

Int. Cl.[4] H01F 3/00

U.S. Cl. 335—281 5 Claims



1. A pole frame assembly for an electromagnetic device comprising:

(a) a frame member formed of ferro-magnetic material and having a generally U-shaped configuration and having a recess formed in the closed end of said U-shaped, said recess having a plurality of raised surface portions disposed thereabout in peripherally spaced arrangement;

(b) a pole piece member formed of ferro-magnetic material and having a generally tubular configuation, with one therof disposed in said recess and registered therein in contact with said raised surface portions and resistance welded thereto for securing said pole piece member to said frame, said pole piece being adapted for insertion into the inner periphery of an electrical coil.

4,698,611

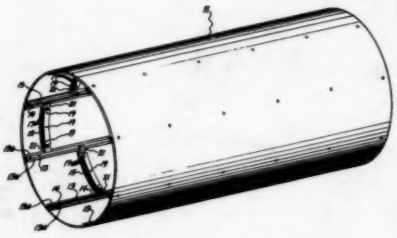
PASSIVE SHIMMING ASSEMBLY FOR MR MAGNET

Mark E. Vermilyea, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 3, 1986, Ser. No. 937,297

Int. Cl.[4] H01F 3/00

U.S. Cl. 335—298 12 Claims



1. A passive shim assembly for a magnet having a central bore, comprising:

a nonmagnetic tube situated coaxially in the bore of the magnet; and

a plurality of predetermined length arcuate strips of ferromagnetic material demountably secured to said tube, said strips extending in the circumferential direction around said tube.

4,698,612

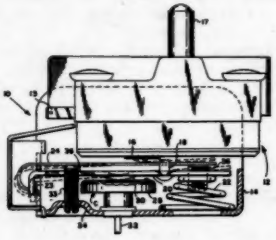
TEMPERATURE LIMITING CONTROL

Randal W. Koehler, Tigard, Oreg., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 13, 1986, Ser. No. 930,192

Int. Cl.[4] H01H 37/38

U.S. Cl. 337—320 9 Claims



1. A thermostatically operated switch assembly comprising:

(a) housing means;

(b) a switch mechanism mounted on said housing means having a pair of electrical contacts at least one of which is moveable for making and breaking a circuit therebetween;

(c) an actuator member moveable with respect to said housing means and operable upon movement to effect actuation and deactuation of said switch mechanism;

(d) a thermally expansible fluid pressure operated capsule mounted on said housing means;

(e) a lever mounted for pivotal movement about a fulcrum on said housing means;

(f) means biasing said lever into contact with said expansible capsule;

(g) a spring member attached to said lever means and adjustable with respect thereto for calibrating contact of said spring member with said actuator member upon movement of said lever by said capsule;

(h) stop means mounted on said housing means, said stop means being disposed to cause said spring member to be deflected with respect to said lever in the event of loss of fluid in said capsule for effecting actuation of said switch mechanism.

4,698,613

CLICK MECHANISM OF SLIDE VOLUME CONTROL

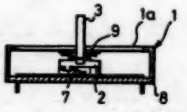
Tsutae Okuya, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Aug. 26, 1986, Ser. No. 900,498

Claims priority, application Japan, Aug. 30, 1985, 60-131728[U]

Int. Cl.[4] H01C *10/38*

U.S. Cl. 338—176 7 Claims



1. A click mechanism of a slide lever control, comprising:

a frame having a surface provided with an elongated center hole, at least one stop hole on one side of said center elongated hole, and a plurality of stop holes formed in two sets on the other side of said center elongated hole;

a plate spring having an elastic arm formed on each of two sides thereof;

a slide lever mounted with said plate spring on a slider receptacle slidably disposed in said frame with said slide lever protruding from said center elongated hole of said frame and said elastic arms of said plate spring extending toward and engageable with the stop holes on the respective sides of said frame,

wherein said one stop hole on said one side of said frame is located such that the elastic arm on one side of said plate spring engages said stop hole to define a center stop position between the two sets of stop positions defined by said two sets of stop holes on the other side of said frame engageable with the elastic arm on the other side of the plate spring, whereby a difference in the click touch of said center stop position from the other stop positions can be detected.

4,698,614

PTC THERMAL PROTECTOR

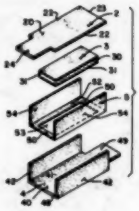
Richard E. Welch, Lexington, and Robert L. Newman, Mansfield, both of Ohio, assignors to Emerson Electric Co., St. Louis, Mo.

Filed Apr. 4, 1986, Ser. No. 848,161

Int. Cl.[4] H01C *7/10*

U.S. Cl. 338—22 R 18 Claims

1. A thermal protector comprising a polymeric PTC element, with broad upper and lower surfaces; upper and lower electrically conductive plate terminals each having a broad inner surface, said polymeric PTC element being sandwiched between and held in intimate electrical contact over substantially its entire broad upper and lower surfaces with said inner surfaces of said upper and lower plate-terminals, respectively; electrical insulation means between said upper and lower plate-terminals outside the areas of contact of said plate-terminals and said PTC element for electrically insulating said upper and lower plate-terminals from one another, and means for mechanically clamping said plate-terminals together, said clamping means being integral with at least one of said plate-terminals.



4,698,615

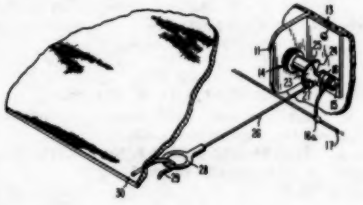
CANVAS ADAPTER ALARM

William E. Wilber, 468 South St., Apt. F., Lockport, N.Y. 14094

Filed Feb. 24, 1986, Ser. No. 832,090

Int. Cl.[4] B60R *25/00*; B63B *17/00*

U.S. Cl. 340—63 5 Claims



1. A canvas adapter alarm for boats, comprising a plurality of mounting brackets secured to a boat;

a plunger switch actuating means secured in said mounting brackets;

alarm means that includes a key switch for arming and disarming said alarm means;

clamp means in operative relationship with said plunger switch actuating means;

chord means connected between said canvas and said clamp means,

whereby when said canvas is disturbed, said clamp means causes said plunger switch actuating means to actuate said alarm means.

4,698,616

OPTOELECTRONIC ROTATIONAL POSITION SENSOR

David A. Krohn, Hamden; David R. Maack, Madison; Edmond I. Vinarub, Cheshire, and John R. Ellison, Jr., Bethany, all of Conn., assignors to Eotec Corp, New Haven, Conn.

Division of Ser. No. 647,031, Sep. 4, 1984, abandoned. This application Nov. 26, 1986, Ser. No. 935,344

Int. Cl.[4] H03K *13/02*

U.S. Cl. 340—347 P 6 Claims

1. Apparatus for sensing the rotational position of a shaft, comprising:

light source means;

first light detecting means for producing an electrical output signal in response to light received at a sensing portion thereof;

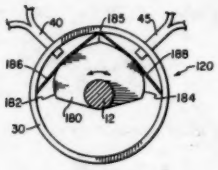
second light detecting means for producing an electrical output signal in response to light received at a sensing portion thereof;

circuit means differentially responsive to the output signals

of said first and second light detecting mean for producing a signal indicative of the rotational position of said shaft;

means including a first deformable light transmitting conduit for providing a first light transmission path between said light source means and said first light detecting means;

means including a second deformable light transmitting conduit for providing a second light transmission path between said light source means and second light detecting means; and



means mechanically adapted to said shaft for deforming said first and second deformable light transmitting conduits to vary the light transmissivity thereof; said deforming means applying a predetermined reference deformation to said first and second conduits when said shaft is in said reference position and imparting opposite changes in deformation to said first and second conduits in response to deviation of the rotational displacement of said shaft from said reference position.

4,698,617

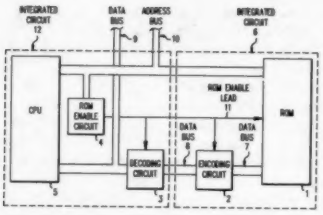
ROM PROTECTION SCHEME

Jerry R. Bauer, San Jose, Calif., assignor to American Microsystems, Inc., Santa Clara, Calif.

Filed May 22, 1984, Ser. No. 613,115

Int. Cl.[4] H03M *13/00*

U.S. Cl. 380—28 **15 Claims**



1. An encoding/decoding circuit comprising:

an encoded data transmission bus comprised of N encoded data transmission lines where N is any positive integer;

a first integrated circuit in which are located:

an input data bus comprised of N data input lines;

an encoding M-bit pseudo-random word generator serving as means for providing an M-bit encoding word, where M is any positive integer;

a bank of N encoding Exclusive-OR gates, each of said encoding Exclusive-OR gates having a first input lead connected to a different line of said input data bus, a second input lead connected to receive any bit of said M-bit encoding word, and an output lead;

wherein said output lead of each of said encoding Exclusive-OR gates is connected to said encoded data transmission bus;

a second integrated circuit chip in which are located:

a decoding M-bit pseudo-random word generator serving as means for providing an M-bit decoding word identical to said M-bit encoding word; and

a bank of N decoding Exclusive-OR gates, each said decoding Exclusive-OR gates having a first input lead connected to a different one of said encoded data transmission lines, a second input lead connected to receive one of said bits of said M-bit decoding word, and an output lead;

wherein said second input lead of each of said decoding Exclusive-OR gates is connected to receive the bit of said decoding M-bit logical word corresponding to an identical bit of said M-bit encoding word; and

an output data bus comprised of N decoded data output lines, each said decoded output line being connected to a different one of said output leads of said decoding Exclusive-OR gate bank.

4,698,618

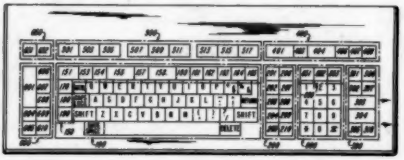
KEYBOARD WITH ARRAYS OF FUNCTION KEYS

James G. Liuzzo, St. Charles, and William J. Proetta, Elburn, both of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 606,946, May 4, 1984, abandoned. This application Sep. 25, 1986, Ser. No. 912,213

Int. Cl.[4] G08C *9/00*

U.S. Cl. 340—365 R **2 Claims**



1. A keyboard for a terminal for use by a telephone assistance operator for communicating with a processor of an operator assistance system comprising:

a main array of keys comprising a plurality of alphabetic keys and a plurality of function keys representing functions including the function of identifying subsequently keyed alphabetic data, said alphabetic keys arranged in the configuration of a QWERTY keyboard;

an array of numeric keys located to the right of said main array comprising a plurality of rows of numeric keys and function keys representing functions including the function of entering a frequently used sequence of numbers, and having an inter-key distance measured by the distanee between centers of adjacent numeric keys of one of said rows of said array of numeric keys;

a first array of keys comprising a plurality of function keys, located adjacent to the left of said array of numeric keys and to the right of said main array, separated from said main array and said array of numeric keys by an inter-array distance, inter-array distances between two arrays being measured by the shortest distance between the center of a key of a first of said two arrays and the center of a key of a second of said two arrays, greater than said inter-key distance, comprising function keys representing functions usually keyed immediately before a number is keyed using said array of numeric keys;

a second array of keys comprising a plurality of function keys located adjacent to the right of said array of numeric keys and separated from said array of numeric keys by an inter-array distance greater than said inter-key distance, comprising function keys representing functions, including the function of initiating the setting up of a connection to a communication terminal identified by a telephone number previously keyed, usually keyed immediately after a number is keyed using said array of numeric keys;

a third array of keys, comprising a plurality of function keys, located to the left of said main array and separated therefrom by an inter-array distance greater than said inter-key distance;

an array group of keys, comprising a plurality of variable function keys, located behind said main array and separated therefrom by an inter-array distance greater than said inter-key distance;

wherein said main array further comprises a control key for controlling change of functions of said plurality of variable function keys; and

wherein each of said main array, said first, second, and third arrays, and said array of numeric keys has a back row of keys, and wherein the back row of said third array, said main array, said first array, said array of numeric keys, and said second array are aligned in a straight line;

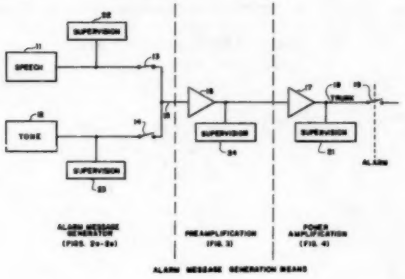
whereby said array of numeric keys and said first and second arrays are positioned so that they can be readily accessed by the right hand of said telphone assistance operator.

4,698,619

VARIABLE FREQUENCY FIRE TONE GENERATOR

Phillip J. Loeb, Palatine, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 7, 1984, Ser. No. 607,546
Int. Cl.[4] G08B *3/00*
U.S. Cl. 340—384 E **4 Claims**



1. A digital fire tone generator for providing a variable frequency fire tone signal, comprising:

first means for providing first clock pulses at a first frequency;

second means for providing second clock pulses at a second frequency which is lower than said first frequency;

first counter means responsive to said second clock pulses from said second means for providing cyclically recurring output counts from a first count to a last count, said counts occurring at a rate corresponding to said second frequency; and

second counter means having count terminals for receiving output counts from said first counter and for counting said first clock pulses in a predetermined direction from each received one of said input counts to a first predetermined count, said second counter providing an output signal which cyclically varies in frequency from one frequency to another frequency in accordance with said cyclically recurring output counts.

4,698,620

FLUID-CONTAINING SECURITY DEVICE

Steven G. Marshall, 70 Chestnut Ct., Belle Mead, N.J. 08502

Filed Oct. 31, 1985, Ser. No. 793,584
Int. Cl.[4] G08B *13/18, 13/06, 1/00, 5/40*
U.S. Cl. 340—568 **5 Claims**

1. An electronic security device which comprises:

(a) An electrical circuit member having a circuit which is capable of actuating a signal alarm upon being cut, said electrical circuit member being releasably attachable to merchandise;

(b) An electronic signal alarm attached to said electrical circuit member and actuated by the cutting of said electrical circuit member; and,

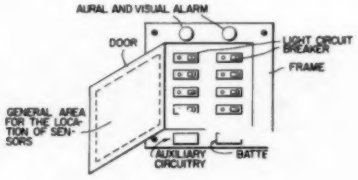
(c) A fluid-containing member which fully encapsulates a fluid having a distinctly noticeable quality, said fluid-containing member being breakable so as to release said fluid in response to a predetermined force, said fluid-containing member being a plastic tube which includes said electrical circuit member contained therein.

4,698,621

CIRCUIT BREAKER PANELS WITH ALARM SYSTEM

Oscar Vila Masot, Doral Beach, Compejo Turistico "El Morro", Puerto La Cruz, Venezuela

Filed Sep. 25, 1984, Ser. No. 654,157
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—639 **9 Claims**



1. An alarm system used in conjunction with conventional thermoelectrically or magnetically actuated circuit breakers provided in electrical panel boxes, each of the circuit breakers provided with a movable non-magnetic toggle switch, the system comprising:

sensing means provided in proximity with said circuit breakers but physically and electrically disconnected from said circuit breakers for sensing the occurrence of an abnormal circuit condition, said sensing means sensing the movement of the toggle switch from the ON to the TRIPPED position; and

alarm means electrically connected to said sensing means for indicating the presence of an abnormal circuit condition at a position removed from the interior of the electrical panel boxes.

4,698,622

BRAKE APPARATUS FOR AUTOMATIC DOOR

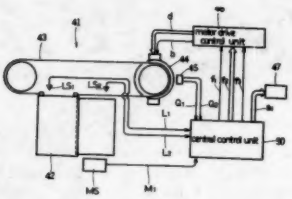
Teruo Goto, Osaka; Yoshirou Takata, Otsu; Kenji Muraji, Osaka, and Mikio Higashi, Kyoto, all of Japan, assignors to Daihatsu Diesel Mfg. Co., Ltd., Osaka, Japan

Filed Apr. 10, 1985, Ser. No. 722,069
Claims priority, application Japan, Apr. 16, 1984, 59-77432; Jun. 25, 1984, 59-95768[U]; Aug. 31, 1984, 59-183147
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—648 **2 Claims**

1. A brake apparatus for automatic door comprising:

(a) speed pulse signal output means for providing speed pulse signals at an interval time inversely proportional to door speed of an automatic door; (b) braking means for lowering the door speed; (c) braking position detecting means for detecting the braking position where said braking means starts breaking; (d) brake effect measuring means for measuring the effect of said braking means; (e) brake defective signal output means for detecting malop-

eration of the braking means based on the measured brake effect and for providing a brake defective signal; and (f)



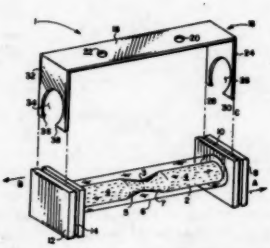
alarm means for providing alarm at output of said brake defective signal.

4,698,623

OVERLOAD DETECTION APPARATUS

Richard G. Smith, 5909 Western Oaks Dr., Orlando, Fla. 32808

Filed Nov. 7, 1984, Ser. No. 669,456
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—665 **15 Claims**



1. A device for detecting an overload of a structural member comprising:

an elongated frangible tube having closed ends thereof, said frangible tube having a central reduced cross-sectional area thereof for forming a weakened portion of said tube;

a liquid substantially filling said closed ended frangible tube;

an elongated open ended outer tube disposed about and spaced from said frangible tube; and

bracket means for closing said open ends of said outer tube, for resiliently supporting said closed ends of said frangible tube, and for attachment to said structural member whereby said frangible tube will fracture when said tube is subjected to a predetermined overload.

4,698,624

DEFINITION OF LINE UNIT SIZE

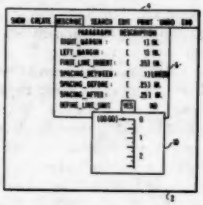
Barbara A. Barker, Williamson County; Irene H. Hernandez, and Rex A. McCaskill, both of Travis County, all of Tex., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Apr. 16, 1985, Ser. No. 723,822
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—709 **4 Claims**

1. A method of defining line unit size in a computer based text editor, said computer having an all points addressable display and a keyboard, said method comprising the steps of

displaying a vertical scale line and a handle selectable by means of a cursor adjacent the scale line,

selecting the handle with a cursor and moving the handle to a position on the scale line which represents the desired line unit size, and



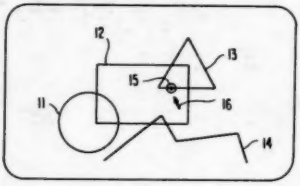
providing an input to the computer deselecting the handle to define the line unit size as indicated by the position of the handle relative to the scale line.

4,698,625

GRAPHIC HIGHLIGHT ADJACENT A POINTING CURSOR

Rex A. McCaskill, and John S. Wang, both of Travis County, Tex., assignors to International Business Machines Corp., Armonk, N.Y.

Filed May 30, 1985, Ser. No. 739,371
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—709 **10 Claims**



1. A method of facilitating the selection of graphic data on a display screen of a computer comprising the steps of:

displaying a pointing cursor on said display screen;

pointing to a graphic object displayed on said display screen by moving said pointing cursor on said display screen proximate to said graphic object by means of a pointing device connected to said computer; and

highlighting only a portion of said graphic object when pointed to by said pointing cursor within a predetermined distance to indicate the object that would be selected by an input signal to said computer, said highlighting step being performed exclusive of the step of displaying said pointing cursor.

4,698,626

COORDINATE-DATA INPUT DEVICE FOR CRT DISPLAY HAVING CURSOR TRAVEL CONTROL MEANS

Yoshitsugu Sato, Kuwana, and Satoshi Furukawa, Suzuka, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 29, 1985, Ser. No. 739,040
Claims priority, application Japan, Jun. 2, 1984, 59-113634
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—710 **12 Claims**

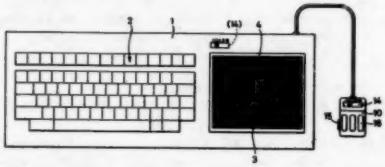
1. A coordinate-data input device for moving a cursor on a screen of a cathode-ray tube display which is controlled by a controller, comprising:

a planar board having a top surface;

a manually movable unit movable on the top surface of said

planar board in X-axis and Y-axis directions, said manually movable unit including detector means for detecting amounts of movement of said manually movable unit in said X-axis and Y-axis directions on said planar board;

magnification selector means for selecting one of a plurality of values of magnification; and



processing means electrically connected to said controller of the cathode-ray tube display, said detector means and said magnification selector means, for obtaining distances of movement of said cursor on the screen of said display, by multiplying the detected amounts of movement of the manually movable means by said one value of magnification selected by said selector means.

4,698,627

PROGRAMMABLE SEMICONDUCTOR SWITCH FOR A LIGHT INFLUENCING DISPLAY AND METHOD FOR MAKING SAME

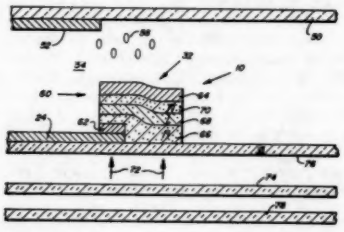
Willem den Boer, Troy; J. Scott Payson, Pleasant Ridge, and Zvi Yaniv, Southfield, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 603,852, Apr. 25, 1984, Pat. No. 4,667,189. This application Dec. 10, 1984, Ser. No. 679,770

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.[4] G09G *3/34*

U.S. Cl. 340—718 **16 Claims**



1. A pixel for a display comprising:

an insulative substrate;

a pixel electrode formed on said substrate;

threshold means for isolation coupled to said electrode;

and a multilayer radiation blocking address line overlying said threshold means with said threshold means including means responsive to optical radiation for programming a threshold voltage at which said threshold means conducts current between said address line and said pixel electrode.

4,698,628

METHOD AND APPARATUS FOR TRANSMISSION OF DATA WITH DATA REDUCTION

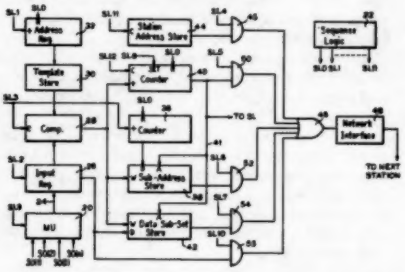
Hans Herkert, Hohenschaeftlarn, and Uwe Timmermann, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 4, 1985, Ser. No. 784,111

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1984, 3436435

Int. Cl.[4] H04Q *9/00*

U.S. Cl. 340—825.02 **9 Claims**



1. A method for the transmission of data over a transmission path, from a first station to a second station, wherein said first station edits data to be transmitted and forwards it in edited form as a data block, comprising the steps of: dividing the data to be transmitted into one or more sub-sets, suppressing the sub-sets whose information content coincides with a predetermined reference content, transmitting the remaining data subsets togethers with the address of the transmitting station, and with a data control identifying a characteristic of the data block, organizing the data network in a tree structure with each station at one network level being connected to a plurality of stations at a lower network level and to one station at a higher network level, and constructing data blocks to be transmitted by stations of said one network level containing the address of said one station, a data control signal in a sequence of the data blocks received from the connected stations of the next lower network level, said data control signal containing information identifying the number of data blocks following said control signal.

4,698,629

METHOD AND APPARATUS FOR COORDINATION AMONG DISTRIBUTED SUBSYSTEMS

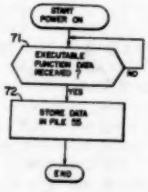
Kinji Mori, Yokohama; Shoji Miyamoto, Kawasaki, and Hirokazu Ihara, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 21, 1983, Ser. No. 544,137

Claims priority, application Japan, Oct. 22, 1982, 57-18455

Int. Cl.[4] G05B *19/42*; G06F *15/46*

U.S. Cl. 340—825.05 **6 Claims**



1. In a system including a plurality of distributed subsystems each of which is capable of executing at least one of a plurality

of predetermined operations on a given object to be processed by this system, an apparatus for coordinating operations among the distributed subsystems in the form of coordinator means provided for each of said subsystems and connected for communication with the coordinator means of other subsystems through a transmission medium, at least one of said subsystems including means for applying to said transmission medium through its coordinator means information relating to one or more operations to be executed on a given object, and at least each coordinator means connected to a subsystem other than said one subsystem comprising:

memory means for storing information regarding the operations which are executable by the associated subsystem and a predetermined rule for coordination of the operations of said subsystems;

means for judging whether an operation to be next executed on an object to be processed is included in said information regarding executable operations stored in said memory means;

means for determining, when the operation to be next executed on the object is included in said stored information regarding executable works, at least one performance index indicative of a parametric condition required for the associated subsystem to execute said operation on said object based on the present operating status of said associated subsystem; and

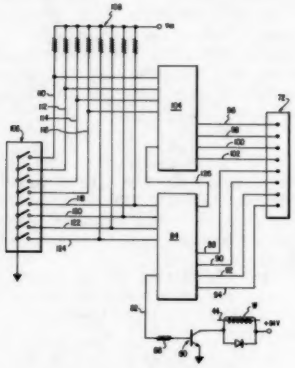
means for deciding whether said associated subsystem should execute said operation on said object based on the determined performance index determined by that and other coordinator means and said rule stored in said memory means.

4,698,630

SECURITY SYSTEM

Thomas R. Ellsberg, Los Angeles, Calif., assignor to American Locker Group Incorporated, Jamestown, N.Y.

Filed Jun. 12, 1985, Ser. No. 743,911
Int. Cl.[4] G06F *7/04*; G07D *7/00*; G06K *7/01*, *5/00*
U.S. Cl. 340—825.31 **20 Claims**



1. In a security locking system, a plurality n of compartments each having a door giving access thereto and lock means for locking each door, each lock means being responsive to a different fixed, unique digital code of m bits;

console means for gaining access to said compartments, said console means including console circuit means for accepting a plurality n of different arbitrary mulitiple digit codes in which each arbitrary multiple digit code differs from any fixed, unique digital code to which the lock means are responsive, and for producing a fixed, unique digital code of m bits which electronically opens that particular lock means associated with the particular selected arbitrary multiple digit code; and

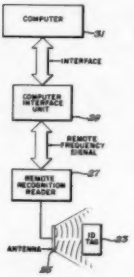
additional circuit means associated with each lock means for allowing all of said lock means to be connected by common wiring, having at least m conductors where 2^m encompasses the number n, to said console means, said additional circuit means including comparator means at each lock means responsive to one of said different fixed, unique digital codes of m bits to open the associated lock means, all of said comparator means being connected to the same m conductors of said common wiring.

4,698,631

SURFACE ACOUSTIC WAVE PIPE IDENTIFICATION SYSTEM

Joseph L. Kelly, Jr.; Mig A. Howard, both of Houston, Tex.; Paul A. Nysen, Sunnyvale, and Colin A. Hacking, Palo Alto, both of Calif., assignors to Hughes Tool Company, Houston, Tex.

Filed Dec. 17, 1986, Ser. No. 943,338
Int. Cl.[4] G01V *1/00*
U.S. Cl. 340—853 **6 Claims**



1. A system for detecting an identification number on tubular drill string sections as they are moved into and out of a well through the rig floor of a drill rig, comprising in combination:

a cavity formed within the sections of the drill string;

an aperture leading from the cavity to the exterior of the section;

a SAW identification device including a SAW chip and an antenna located in the cavity and extending into the aperture, the chip having means for reradiating through the antenna and out the aperture a signal that corresponds to a selected digital number encoded in the chip;

transmitter and receiver means including an antenna adapted to be mounted adjacent the rig floor, for sending radio frequency signals through the aperture to the identification device as the drill string moves up and down through the rig floor, for receiving the reradiated signals from the identification device, and for providing a digital code corresponding to the digital number encoded in the chip; and

memory means for receiving and storing the digital code from the transmitter and receiver means.

4,698,632

RADAR DETECTOR

Yoshihiko Baba, Noda, and Masahiko Yamaguchi, Matsudo, both of Japan, assignors to Uniden Corporation, Ichikawa, Japan

Filed Jun. 19, 1985, Ser. No. 746,384
Claims priority, application Japan, Jun. 19, 1984, 59-124474
Int. Cl.[4] G01S *7/36*
U.S. Cl. 342—17 **8 Claims**

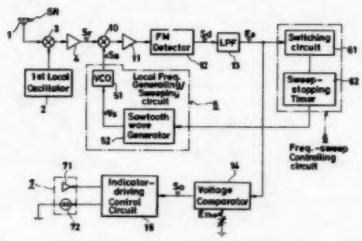
1. A radar detector comprising:

a mixer for performing frequency-conversion of an incoming

electromagnetic wave radar signal to a corresponding input frequency signal;

a local-frequency sweeping circuit for providing to said mixer a local signal whose frequency varies with time in a fixed frequency range;

an FM detector circuit for performing FM-detection on said input frequency signal, thereby providing a detection signal having higher-frequency or noise components therein, these components being suppressed when said input frequency signal matches said local signal in frequency;



a frequency-sweep controlling circuit responsive to disappearance of said noise components in said detection signal for preventing said local-frequency sweeping circuit from continuing the frequency sweep for a fixed length of time; and

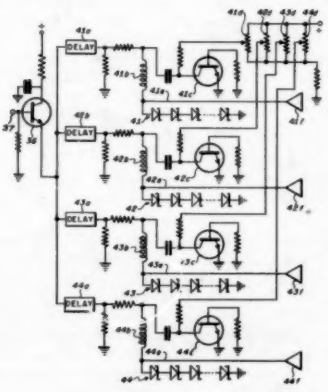
means for distinguishing said incoming electromagnetic wave radar signal from interference signals on the basis of the lengths of time for which said noise components are suppressed in said detection signal during the temporary discontinuation of the frequency sweep in said local-frequency sweeping circuit.

4,698,633

ANTENNAS FOR WIDE BANDWIDTH SIGNALS

David Lamensdorf, Arlington; Kenneth W. Robbins, Wilmington, and Gerald F. Ross, Lexington, all of Mass., assignors to Sperry Corporation, New York, N.Y.

Filed May 19, 1982, Ser. No. 380,805
Int. Cl.[4] G01S *13/74*
U.S. Cl. 342—42 **27 Claims**



1. A short pulse antenna system comprising:

means for applying trigger pulses;

charging means responsive to said trigger pulses for supplying charging pulses;

pulse means charged in response to pulses coupled thereto from said charging means;

means responsive to said charging means and coupled to said pulse means for providing discharge pulses to said pulse means at predetermined time intervals subsequent to said charging pulses to discharge said pulse means and establish a sequence of short pulses of predetermined duration, preselected rise time, and having said predetermined time intervals therebetween; and

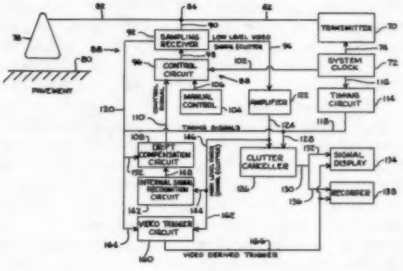
an array of antenna elements coupled to receive pulses from said pulse means in corresponding sequence for providing radiated pulses, said antenna elements having spacings therebetween equal distances traveled by light propagating in free space for a time equal to said predetermined time interval.

4,698,634

SUBSURFACE INSPECTION RADAR

Anthony V. Alongi, 6865 Walmore Rd., Niagara Falls, N.Y. 14304, and Anthony J. Alongi, 4214 Washington St., Niagara Falls, N.Y. 14305

Filed Jul. 10, 1985, Ser. No. 753,695
Int. Cl.[4] G01S *7/28*
U.S. Cl. 342—22 **17 Claims**



1. A radar system for subsurface inspection comprising:

(a) transmitter means for generating short pulse signals;

(b) antenna means spaced from and movable over a surface to be inspected for radiating said signals to and receiving external reflection from said surface and from below said surface, said external reflections being developed external to said system and comprising a plurality of signals spaced in time and each having a characteristic waveshape;

(c) receiver means coupled to said antenna means for providing output signals in response to said external reflections; and

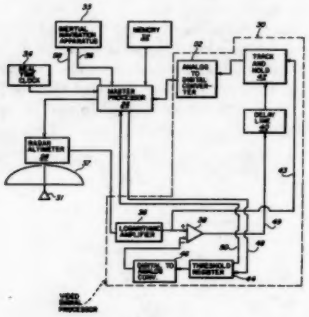
(d) clutter cancellation means operatively connected to said receiver means for eliminating internal reflections developed in said system to prevent interference by said internal reflections with the desired external reflections to enhance the system detection capability and reliability of evaluation of said external reflections, said internal reflections comprising signals generated within said system by said antenna means, said transmitter means and said receiver means.

4,698,635

RADAR GUIDANCE SYSTEM

Richard D. Hilton, King George, Va., and Godfrey T. Coate, Belmont, Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 2, 1986, Ser. No. 855,206
Int. Cl.[4] G01S *13/89*
U.S. Cl. 342—64 19 Claims



1. A radar guidance system for the navigation apparatus of an airborne vehicle, said system comprising:

radar altimeter means for transmitting a series of pulses for impacting a series of relatively spaced points along the vehicle ground track of substantially flat terrain having random and different features,

video signal processor means connected to the altimeter means for receiving the echo signal from each pulse-impacted point of the series, the echo signal of a given pulse-impacted point being indicative of the average weighted reflectivity of one or more random and different terrain features surrounding the given point, said video signal processor means being comprised of logarithmic amplifier means, comparator means, delay line means, and track-and-hold means, said comparator means and said track-and-hold means being parallel connected to the output of said logarithmic amplifier means, said delay line means being connected to the output of the comparator means, said track and hold means being connected to the output of the delay line means, said track and hold means for receiving and correlating the outputs of the amplifer means and the delay line means in order to determine a point of intersection therebetween that is indicative of a qunatitized value of a delay sample of an annulus made up of one or more random and different terrain features of average-weighted reflectivity of an echo signal about a given pulse-impacted point along the vehicle ground track during system use,

said video signal processor means being provided with further means, said further means being connected to the output of the track and hold means, for transforming the delay sample of each annulus into a digital signal, and

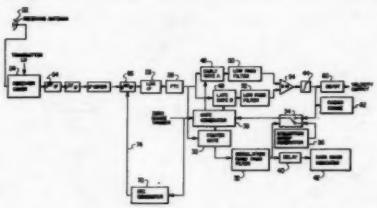
master processor means connected to the output of the further means for combining a series of digital signals of the video signal processor means into an arrayed output and then comparing the arrayed output with a series of stored digital arrays arranged in matrix fashion in order to ascertain which stored digital array of the series thereof is substantially matched by the arrayed output for the purpose of enabling the determination whether the actual ground track of the vehicle corresponds to the intended ground track thereof.

4,698,636

GROUND SPEED DETERMINING RADAR SYSTEM

Raymond Marlow, Rte. 4, #6 Eastshore Rd., Rockwall, Tex. 75087, and John L. Nelson, Jr., 2408 Scorpius, Garland, Tex. 75042

Filed Apr. 20, 1984, Ser. No. 602,344
Int. Cl.[4] G01S *13/60*
U.S. Cl. 342—104 8 Claims



3. A radar for use in a ground speed determining system comprising:

a transmitter means for transmitting microwave energy to a modulating reflector;

a receiver means for receiving the return energy;

a reflector return energy acquisition loop circuit, said acquisition loop circuit including a center gate means, a modulation band pass filter means, switching means, acquisition sweep generator means and gate generator means, said switching means operatively connected to a tracking loop acquisition sweep generator means, modulation band pass filter, and gate generator means for selectively connecting the output of the tracking loop for feedback and the output of the acquisition sweep generator means to the gate generator means in response to the output of the modulation band pass filter, said generator means operatively connected to the tracking loop and center gate means for generating gate signals from the input of the switching means for the tracking loop and the center gate means, said, center gate means operatively connected to the receiver and gate generator for outputting the return energy, said modulation band pass filter operatively connected to the center gate for receiving the return energy and selectively indicating the presence and absence of the reflector return energy whereby said switching means inputs the output of the acquisition sweep generator until acquisition of the reflector return energy and the feedback output of the tracking loop during acquisition;

a reflector tracking loop circuit and a velocity determining means, said acquisition loop circuit and tracking loop circuit operatively connected to the receiver and coacting to determine acquisition of the reflector return energy and to provide from the reflector return energy reflector range information and said velocity determining means operatively connected to receive the range information and determining ground speed.

4,698,637

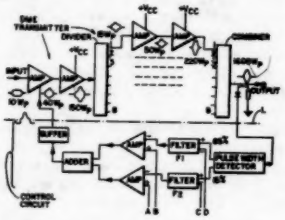
DEVICE FOR PULSE MODULATION AUTOMATIC CONTROL

Giuseppe Bertocchi, Vertova, Italy, assignor to International Standard Electric Corporation, New York, N.Y.

Filed May 4, 1981, Ser. No. 259,928
Int. Cl.[4] G01S *1/44*
U.S. Cl. 342—399 9 Claims

1. A device for pulse modulation automatic control for use in pulse equipments or radio frequency equipments including pulse modulation, such as distance measuring equipments used for air navigation suitable to accept rectangular reference pulses of fixed duration, in which the modulating signal is obtained by adding a plurality of differently shaped pulse components each having a level controlled by said reference

pulses, including circuit means to provide, before said components are added, electrical amplitude control for each of said components of said modulating signal in response to said reference pulses and pulse width detected radio frequency pulses at predetermined percentages of peak level, said electrical amplitude control being discretely effective to set and control said component levels and being continuously variable and becoming stable only when the pulse widths of the pulse width detected pulse, at said predetermined percentages of peak level, are equal to the widths of said reference pulses.

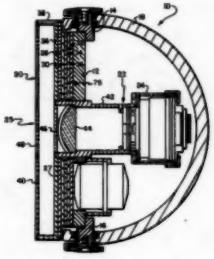


4,698,638

DUAL MODE TARGET SEEKING SYSTEM

John T. Branigan, Claremont, and Jacques J. Malaise, Mountain View, both of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 26, 1985, Ser. No. 813,745
Int. Cl.[4] H01Q *13/10, 21/28*
U.S. Cl. 343—725 **17 Claims**



1. A dual mode target seeking system for an airborne vehicle, comprising:

a radio frequency antenna structure including an antenna plate having an antenna array across its surface for receiving and transmitting radio frequency radiation, the plate having an outer surface defining a ground plane, means for transmitting signals to said antenna array and means for receiving signals incident on said array; and

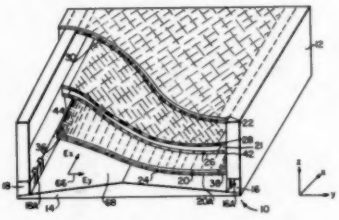
an electro-optical processing system extending through said radio frequency antenna structure and including directing means for directing incoming electro-optical radiation to a point behind said radio frequency antenna; the directing means including a window mounted in said antenna plate with its outermost face substantially flush with said ground plane to form a substantially continuous surface with said antenna plate, said window comprising means for transmitting radiation in said predetermined electro-optical frequency range and for at least partially reflecting radio frequency radiation.

4,698,639

CIRCULARLY POLARIZED LEAKY WAVEGUIDE DOPPLER ANTENNA

James B. Mead, Brookside, N.J.; Robert Bevan, Pleasantville, N.Y., and Leonard Schwartz, Montville, N.J., assignors to The Singer Company, Stamford, Conn.

Filed Jan. 14, 1986, Ser. No. 818,646
Int. Cl.[4] H01Q *15/24*
U.S. Cl. 343—756 **18 Claims**



1. A leaky waveguide antenna for generating at least one circularly polarized beam to eliminate errors caused by raindrop reflections, the leaky waveguide antenna comprising:

waveguides working cooperatively with reflector means for emitting a linear beam;

a first layer of equally spaced co-planar parallel conductive lines positioned in front of the reflector means for polarizing the linear beam;

a second layer of equally spaced co-planar parallel conductive lines positioned in parallel spaced relation to the first layer, the parallel conductive lines of the second layer being oriented perpendicularly to the conductive lines of the first layer for substantially purifying the linearly polarized beam;

a third layer, having a dual set of spaced co-planar parallel conductive lines aligned perpendicularly to each other, superposed over the second layer, the dual set of co-planar conductive lines positioned diagonally to the second layer of conductive lines for polarizing the substantially purified linearly polarized beam into a partially circularly polarized beam; and

a fourth layer, having a second dual set of spaced co-planar parallel conductive lines aligned perpendicularly to each other, superposed over the third layer, the second dual set further polarizing the partially circularly polarized beam into a circularly polarized beam for substantially eliminating the errors caused by the raindrop reflections.

4,698,640

ADJUSTABLE PLATFORM MOUNTEED HORN ANTENNA

Gary M. Redman, Mountain View, Calif., assignor to GTE Sprint Communications Corp, Burlingame, Calif.

Filed Aug. 8, 1985, Ser. No. 763,494
Int. Cl.[4] H01Q *3/02*
U.S. Cl. 343—882 **17 Claims**

1. Apparatus for rotatably supporting an antenna assembly at an elevated location comprising:

support means extending in a generally vertical direction above ground;

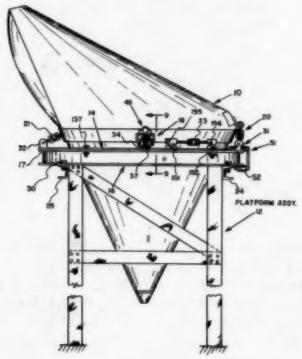
a first support member having a first cylindrical portion and a flat first circumferential ring-shaped flange portion having a larger and a smaller diameter that is rigidly attached to said cylindrical portion thereof;

means for rigidly nonrotatably securing said first support member to said support means;

a second support member having a second cylindrical portion and a flat second circumferential ring-shaped flange portion that is rigidly secured to the cylindrical portion thereof; the diameter of said second cylindrical portion

and of one said diameter on said first support member being dimensioned for smoothly nesting said second support member either in or over said first support member with the ring portions thereof in supportive contact over substantially the entire surface areas thereof and for enabling the second support member to smoothly rotate either in or on said first support member; and

first means for attaching the antenna assembly to said second support member whereby rotation of said second support



member with respect to said first support member causes desired rotation of the antenna assembly, the height of said cylindrical portion being less than the height of said first cylindrical portion,

and fixing means for rigidly fixing the rotational position of said second support member with respect to said first support member comprising clamp means for selectively squeezing said first and second support members together to create a frictional force between ring portions thereof which prevents rotation thereof.

4,698,641

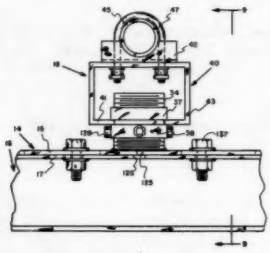
ADJUSTMENT DEVICE FOR PLATFORM MOUNTED HORN ANTENNA

Wallace Evans, Santa Clara, and Gary M. Redman, Mountain View, both of Calif., assignors to GTE Sprint Communications Corp, Burlingame, Calif.

Filed Aug. 8, 1985, Ser. No. 763,495

Int. Cl.[4] H01Q *3/02*

U.S. Cl. 343—882 **16 Claims**



1. Apparatus for adjusting the orientation of a first axis of rotation of an antenna assembly that is rotatable supported by a baseplate, where the first axis of rotation extends through axially aligned trunnion pipes on the antenna assembly and the baseplate has a top and a bottom, said apparatus comprising:

a rigid member having a threaded exterior surface and having a longitudinal second axis of the threads;

means for rigidly attaching said threaded member to the baseplate with said second axis substantially orthogonal to the top of the baseplate;

first nut means screwed onto said threaded member;

a rigid tubular shaped enclosure having an opening through one side thereof that is dimensioned for making a smooth sliding fit over said threaded member;

second nut means screwed onto said threaded member with said one side of said tubular enclosure on said threaded member being located between said first and second nut means;

clamp means attached to and rotatably supporting one of said trunnion pipes; and

means for rigidly attaching said clamp means to said tubular enclosure so as to support the antenna assembly for rotation about said first axis of rotation;

adjustment of the orientation of the first axis of rotation of the antenna assembly being varied by screwing said first nut means relative to the exterior of said threaded member whereby the antenna assembly is levelled in a first plane including said first axis of rotation of the antenna assembly and being substantially orthogonal to the baseplate, the second nut means being tightened against the side of said enclosure opposite said first nut means for fixing the orientation of the first axis of rotation of the antenna assembly.

4,698,642

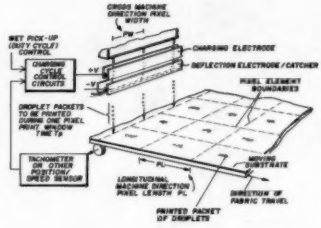
NON-ARTIFICALLY PERTURBED (NAP) LIQUID JET PRINTING

Rodger L. Gamblin, Dayton, Ohio, assignor to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. No. 428,490, Sep. 28, 1982, Pat. No. 4,523,202, which is a continuation-in-part of Ser. No. 231,326, Feb. 4, 1981, abandoned. This application Jun. 10, 1985, Ser. No. 742,861

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—75 **20 Claims**


CROSS MACHINE DIRECTION PIXEL WIDTH
WET PICK-UP (DUTY CYCLE) CONTROL
CHARGING CYCLE CONTROL CIRCUITS
CHARGING ELECTRODE
DEFLECTION ELECTRODE / CATCHER
PIXEL ELEMENT BOUNDARIES
DROPLET PACKETS TO BE PRINTED DURING ONE PIXEL PRINT WINDOW TIME Tp
TACHOMETER OR OTHER POSITION / SPEED SENSOR
MOVING SUBSTRATE
LONGITUDINAL MACHINE DIRECTION PIXEL LENGTH PL
DIRECTION OF FABRIC TRAVEL
PRINTED PACKET OF DROPLETS

1. A liquid jet device for printing, coloring or otherwise treating a receiving substrate placed thereunder along a cross-machine dimension while the substrate moves along a longitudinal direction transverse to said cross-machine direction, said device having a predetermined droplet misregistration value and comprising:

means for randomly generating droplets from a liquid stream, said random generating means having a predetermined cross-machine width in excess of 10.5 inches and including a source of pressurized liquid at pressure P and orifice means defining a plurality of jet orifices extending in said cross-machine direction, each orifice having a diameter D through which said liquid issues so that droplets are randomly formed having differing sizes and spacings therebetween, said pressure P and orifice dimension D being controlled so that droplet break up occurs substantially within a predetermined distribution around a mean droplet size,

charging electrode means disposed downstream of said

orifices for a predetermined charging distance to selectively impart charges to droplets as they are randomly formed,

collection means for collecting droplets; and

deflection means disposed downstream of said charging electrode means and opposite said collection means for deflecting the paths of the selectively charged droplets away from the receiving substrate and toward said collection means,

said pressure and diameter values P and D being predetermined to provide said predetermined droplet misregistration value on the substrate surface even though droplet generation occurs randomly.

4,698,643

SERIAL TYPE THERMAL HEAD

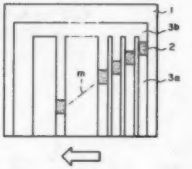
Yasuo Nishiguchi; Tsuyoshi Yasutomi, both of Kokubu, and Ryoichi Shiraishi, Kagoshima, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed Dec. 24, 1985, Ser. No. 812,971

Claims priority, application Japan, Dec. 27, 1984, 59-198400[U]

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **8 Claims**



1. A thermal head of the type used for serial printing and having a scanning direction associated therewith, comprising:

a substrate;

a ridged glaze layer formed on the surface of the substrate and extending obliquely to the scanning direction of the thermal head;

a group of heat-generating elements, each of said heat-generating elements comprising a heat-generating resistor and a pair of electrodes connected in series to the heat-generating resistor at opposite connection edge sides of said resistor arranged in the transverse direction of the ridged glaze layer and spaced apart a small interval from the adjacent heat-generating elements, each of said heat-generating resistors being arranged in the central portion of the ridged glaze layer and having a parallelogram shape in which both of the connection edge sides of the heat-generating resistor are parallel to the extension direction of the ridged glaze layer; and

wherein each of said adjacent heat-generating resistors are arranged so that one triangular corner of the heat-generating resistor located on one connection edge side overlaps another triangular corner of the adjacent heat-generating resistor located on another connection edge side with respect to the scanning direction.

4,698,644

DROP-ON-DEMAND INK JET PRINT HEAD

Gary A. Drago, Longmont, Colo.; Walter F. Baier; Francis C. Lee, both of San Jose, Calif.; Ross N. Mills, Boulder, Colo., and Horst G. Mossbrugger, San Jose, Calif., assignors to International Business Machines, Armonk, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,055

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **17 Claims**

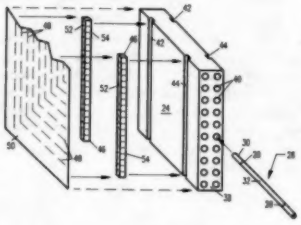
1. An ink jet drop-on-demand print head comprising:

a plurality of tubular piezoelectric transducers each having a first and a second separate electrically conducting coating formed thereon;

a mounting member for holding said transducers in a spaced apart position;

a substrate having a conductor pattern including a plurality of separate electrical conductors thereon and means for mounting said substrate in a fixed position adjacent a plurality of said transducers;

a resilient connector means that is not electrically conductive along one dimension but is electrically conductive across other dimension; and



means for positioning said connector means in a fixed position relative to said transducers and said substrate so that an electrical oonnection is made between one of said conductive coating on each of said plurality of transducers and one of the circuit patterns on said substrate so that each of said transducers can be selectively energized to produce one drop of ink each time the transducer is energized.

4,698,645

INK-JET RECORDING HEAD WITH AN IMPROVED BONDING ARRANGEMENT FOR THE SUBSTRATE AN COVER COMPRISING THE HEAD

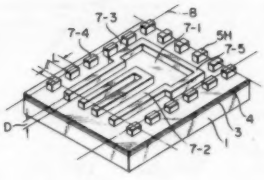
Tadayoshi Inamoto, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,520

Claims priority, application Japan, Mar. 1, 1984, 59-37305

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **10 Claims**



1. An ink-jet recording apparatus comprising:

a substrate,

an ink channel forming member for forming an ink channel on said substrate,

a cover on said ink channel forming member cooperating with said ink channel forming member to provide an ink channel, and

a plurality of bonding members disposed outside said ink channel and bonded to said substrate and/or said cover, wherein said bonding members are formed alternately with spaces at an end face portion of said apparatus, said spaces being defined by said bonding members, said substrate and said cover, wherein the following conditions are satisfied:

$l/d \leqq 10$ and $L/D \leqq 15$

where L is a length of said bonding members, D is a thickness of said bonding members, and l is a length of said spaces.

4,698,646

THERMAL TRANSFER RECORDING SYSTEM

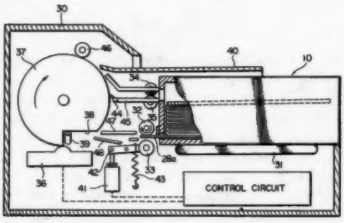
Tsuyoshi Satoh, Tokyo; Tsutomu Mitsuishi, Kawasaki; Kenji Toyoda, Chigasaki; Kaoru Naito, Yokohama; Makoto Ogawa, Hiratsuka, and Hiroshi Sato, Kodaira, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Continuation of Ser. No. 772,709, Sep. 5, 1985, abandoned. This application Jan. 6, 1987, Ser. No. 4,285

Claims priority, application Japan, Sep. 14, 1984, 59-192795; Sep. 14, 1984, 59-192796; Sep. 14, 1984, 59-192798

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **22 Claims**



1. A thermal transfer recording system comprising:

a housing;

a supply cartridge removably mounted in said housing and including an image forming sheet, an ink sheet and a case member containing therein said image forming sheet and said ink sheet, said case member having opening means through which said image forming sheet and said ink sheet are passed;

means for taking-out said image forming sheet and said ink sheet from said case member through said opening means;

print means having a thermal head for printing on said image forming sheet taken-out from said case member by using said ink sheet taken-out from said case member; and

means for feeding said ink sheet used by said print means into said case member through said opening means.

4,698,647

HIGH RESOLUTION PHOTOGRAPHIC FILM PRINTER

Richard K. Gerlach, Rolling Hills Estates, Calif., assignor to Truvel Corporation, Torrance, Calif.

Filed May 13, 1986, Ser. No. 862,674

Int. Cl.[4] G01D *9/42;* **H04N** *1/23*

U.S. Cl. 346—108 **9 Claims**

1. A film printer for exposing photographic film based upon received digital information comprising:

means for maintaining a surface of photographic film in a fixed, stationary position during the exposure thereof; and

a spinning disk exposure assembly, comprising:

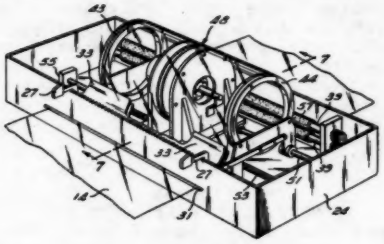
an exposure disk, having an axis of rotation, and a central hub and a peripheral edge, both concentric with said axis of rotation;

at least one optical fiber mounted on said exposure disk, said fiber having a first end located proximate to said central hub and having a second end located proximate to said peripheral edge;

means for rotatably supporting said exposure disk within the spinning disk assembly;

means for laterally translating said spinning disk exposure assembly across said surface of photographic film during the exposure thereof;

a source of optical energy directed towards said first end of said optical fiber; and



means for controlling the emission of said optical energy of said source in response to said received digital data and for coordinating said emission with the rotation of said exposure disk and with the lateral translating of said disk of exposure assembly.

4,698,648

IMAGE RECORDING METHOD AND APPARATUS SUCH AS A LIGHT BEAM MULTIFORMAT CAMERA

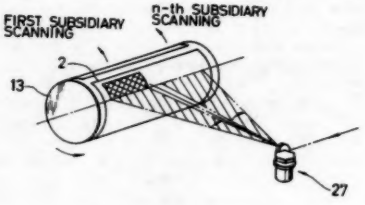
Kazuhisa Takahashi, Yokohama; Keiichi Kawasaki, Tokyo, and Yuji Itoh, Chigawaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1985, Ser. No. 713,702

Claims priority, application Japan, Mar. 22, 1984, 59-53485; Nov. 27, 1984, 59-250308

Int. Cl.[4] G01D *9/42;* **G03G** *15/00*

U.S. Cl. 346—108 **17 Claims**



1. An image recording method having:

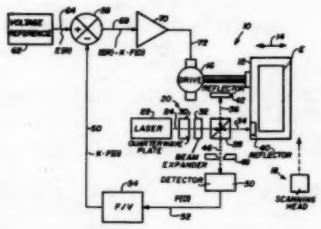
a first step of recording an image on a first area of a recording sheet disposed on a rotatable member by a major scanning operation in which straight line scanning is effected by a light beam scanning optical system, and a first subsidiary scanning operation in which the recording sheet is moved relative to said light beam scanning optical system in a direction intersecting the direction of said major scanning operation; and

a second step of recording an image on a second area of said recording sheet, after N rotations of said rotatable member, N being an integer, by said major scanning operation, and a second subsidiary scanning operation in which said recording sheet is moved relative to said light beam scanning optical system so that said first area again crosses the scanning area of said light beam scanning optical system.

4,698,649
APPARATUS FOR CONTROLLING THE VELOCITY OF A MEMBER IN A DIGITAL PRINTING SYSTEM

Jerald D. Lee, Medenhall, Pa., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Dec. 3, 1985, Ser. No. 804,136
Int. Cl.[4] G01D *9/42*
U.S. Cl. 346—108 **1 Claim**



1. In a printing apparatus of the type having a first member movable rectilinearly along a path of travel with respect to a second member, the path of travel being at least eight inches in length, the improvement which comprises a velocity control system for controlling the velocity at which the first member is moved, the control system comprising:

a source of laser light having a coherence length equal to at least twice the path of travel of the first member;

means including a pair of light reflecting elements, one of which is mounted on the first member, for producing a beam having a time varying intensity the frequency of which is functionally related to the actual velocity of the first member;

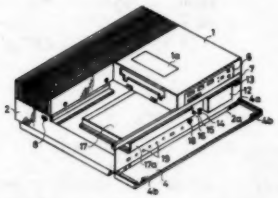
means responsive to the time varying intensity for generating an electrical signal representative of the actual velocity of the first member; and

a servo system responsive to the electrical signal for driving the error between the actual velocity electrical signal and a reference velocity electrical signal toward zero thereby to maintain the velocity of the first member at substantially a predetermined reference velocity.

4,698,650
RECORDING APPARATUS AND CASSETTE FOR RECORDING MEDIUM

Yoshitaka Watanabe, Tokyo; Toshiharu Mamiya, Kawasaki; Tadashi Ishikawa, Urawa, and Takashi Endo, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1985, Ser. No. 715,399
Claims priority, application Japan, Mar. 28, 1984, 59-45843[U]; Mar. 28, 1984, 59-45844[U]; Mar. 28, 1984, 59-45845[U]; Mar. 28, 1984, 59-45846[U]; Mar. 30, 1984, 59-64955
Int. Cl.[4] G01D *15/24;* **B41J** *11/58*
U.S. Cl. 346—134 **14 Claims**



1. A recording apparatus for recording with ink on a sheet-form recording medium, said apparatus comprising a housing having a generally box shape with one side surface extending along the bottom surface, said housing having therein:

(A) a recording medium mounting section for mounting said recording medium;

(B) an ink mounting section for mounting a member containing said ink;

(C) a recording medium accommodating section for accommodating said recording medium already printed; and

(D) operating means for use in operating said apparatus,

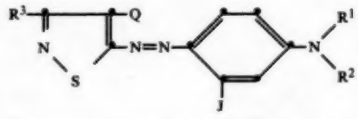
wherein said recording medium mounting section, ink mounting section, and printed recording medium accommodating section each have an opening on said side surface of said housing and said operating means is disposed on said side surface.

4,698,651
MAGENTA DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER

William H. Moore; Max A. Weaver, both of Kingsport, Tenn., and Kin K. Lum, Webster, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 813,208, Dec. 24, 1985, abandoned. This application Oct. 27, 1986, Ser. No. 923,444
Int. Cl.[4] B41M *5/26*
U.S. Cl. 503—227 **17 Claims**

10. In a process of forming a magenta dye transfer image comprising imagewise-heating a dye-donor element comprising a support bearing a dye layer comprising a magenta dye dispersed in a polymeric binder and transferring a magenta dye image to a dye-receiving element to form said magenta dye transfer image, the improvement wherein said magenta dye comprises a substituted 5-arylazoisothiazole having the formula:



wherein R^1 and R^2 may each independently be hydrogen, substituted or unsubstituted alkyl or allyl of from 1 to about 6 carbon atoms, substituted or unsubstituted cycloalkyl of from about 5 to about 7 carbon atoms, substituted or unsubstituted aryl of from about 5 to about 10 carbon atoms; or R^1 and R^2 may be taken together to form a ring; or a 5- or 6-membered heterocyclic ring may be formed with R^1 or R^2, the nitrogen to which R^1 or R^2 is attached, and either carbon atom ortho to the carbon attached to said nitrogen atom;

R^3 may be hydrogen, substituted or unsubstituted alkyl of from 1 to about 6 carbon atoms, substituted or unsubstituted aryl of from about 5 to about 10 carbon atoms, alkylthio or halogen;

J may be substituted or unsubstituted alkyl of from 1 to about 6 carbon atoms, substituted or unsubstituted aryl of from about 5 to about 10 carbon atoms or NHA, where A is an acyl or sulfonyl radical; and

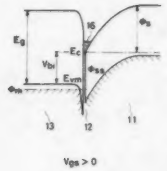
Q may be cyano, thiocyanato, alkylthio or alkoxycarbonyl.

4,698,652

FET WITH FERMI LEVEL PINNING BETWEEN CHANNEL AND HEAVILY DOPED SEMICONDUCTOR GATE

Yasunari Umemoto, Hachioji; Susumu Takahashi, and Yuichi Ono, both of Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 8, 1985, Ser. No. 731,911
Claims priority, application Japan, May 11, 1984, 59-92816
Int. Cl.[4] H01L *29/205, 29/80*
U.S. Cl. 357—16 **13 Claims**



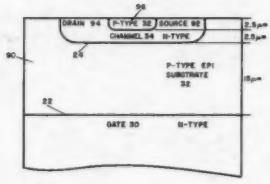
1. A semiconductor device comprising: control means including an interface state layer on a first semiconductor layer having a first type of conductivity, and a second semiconductor layer on said interface state layer, said second semiconductor layer being made of a degenerate semiconductor; and carrier donating and accepting means sandwiching said control means inbetween, said interface state layer having its Fermi level pinned to the Fermi level of said second semiconductor layer.

4,698,653

SEMICONDUCTOR DEVICES CONTROLLED BY DEPLETION REGIONS

Walter T. Cardwell, Jr., 217 Bedford Forrest Ave., Anderson, S.C. 29621

Filed Oct. 9, 1979, Ser. No. 83,092
Int. Cl.[4] H01L *29/76*
U.S. Cl. 357—22 **115 Claims**



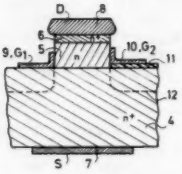
108. A semiconductor device comprising:
a first region of first conductivity type;
second and third regions of second conductivity type opposite to said first conductivity type, said second and third regions being separated by said first region, and forming respective first and second PN junctions with said first region;
said first region being sufficiently thin and having sufficiently low doping level that depletion regions formed by reverse biasing said first and second PN junctions can meet within said first region;
a first electrical contact on said first region;
a second electrical contact on said second region; spaced third and fourth electrical contacts on said third region;
means for applying a first, constant voltage between said first electrical contact and said third electrical contact, of a polarity to reverse bias the second PN junction;
means for applying a second voltage between said first electrical contact and said fourth electrical contact, of a polarity to reverse bias said second PN junction;
means for applying a third, signal voltage between said first electrical contact and said second electrical contact;
said third, signal voltage being of varying magnitude, and having at least intermittently a sufficient magnitude in a polarity to reverse bias said first PN junction that the depletion region due to the reverse bias on said first PN junction reaches the depletion region due to the reverse bias applied to said second PN junction by said first and second voltages;
whereby the impedance between said third and fourth electrical contacts is controlled by said third signal voltage.

4,698,654

FIELD EFFECT TRANSISTOR WITH A SUBMICRON VERTICAL STRUCTURE AND ITS PRODUCTION PROCESS

Erhard Kohn, Orsay, France, assignor to Thomson-CSF, Paris, France

Continuation of Ser. No. 685,738, Dec. 24, 1984, abandoned. This application Sep. 22, 1986, Ser. No. 910,302
Claims priority, application France, Dec. 27, 1983, 83 20840
Int. Cl.[4] H01L *29/80, 29/78, 29/06*
U.S. Cl. 357—22 **6 Claims**



1. A field effect transistor with a submicron vertical structure comprising:
a substrate having a first and second face;
a source electrode metalization on said first face of said substrate;
an active layer formed of a semiconductor material on said second face of said substrate;
a contact layer supported on said active layer formed of a semiconductor material layer;
a drain electrode metalization supported by said contact layer;
a mesa structure etched beneath the drain electrode in the active and contact layer semiconductor layers and cuts at least partly into the active layer, wherein the length of the conductor channel in the active layer is less than 1 micron and wherein two gate electrode metalizations constituting a first and a second gate electrode metalization, are deposited on two opposite sides of the mesa structure and which are arranged in a displaced manner, with the second gate electrode metalization being displaced with respect to the first gate electrode metalization by a layer of insulating material deposited on the upper surface of the active layer freed by the information of the mesa, the second gate increasing the output impedance of the transistor being closer to the drain than the first control gate.

4,698,655

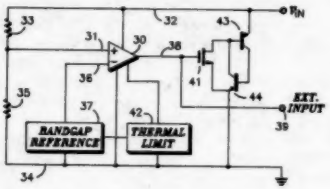
OVERVOLTAGE AND OVERTEMPERATURE PROTECTION CIRCUIT

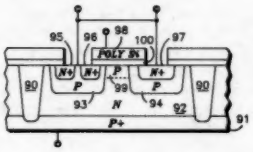
Warren J. Schultz, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 535,180, Sep. 23, 1983, abandoned. This application Feb. 4, 1986, Ser. No. 825,954
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.4 **5 Claims**

1. An overvoltage protection monolithic semiconductor

integrated circuit having a first terminal adapted to receive a first voltage and a second terminal adapted to receive a second voltage, said circuit comprising an output thyristor coupled between said first and second terminals for shunting said first





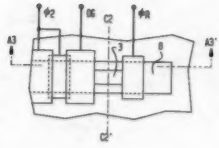
voltage to said second voltage when said first voltage exceeds a predetermined value and a thermal limit circuit coupled to said output thyristor enabling said thyristor to shunt said first voltage to said second voltage when a predetermined temperature is exceeded.

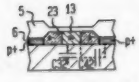
4,698,656

OUTPUT DETECTOR OF A CHARGE COUPLED DEVICE

Takao Kamata, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 27, 1986, Ser. No. 833,289
Claims priority, application Japan, Feb. 27, 1985, 60-37864
Int. Cl.[4] H01L *29/78*; G11C *19/28*
U.S. Cl. 357—24 **4 Claims**





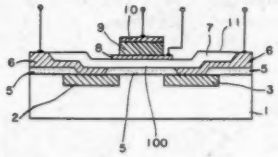
1. A charge coupled device comprising a semiconductor substrate of a first conductivity type, a channel region of a second conductivity type provided opposite the first conductivity type, a means formed on said channel region for transferring charges through said channel region, an output gate formed on one end portion of said channel region through an insulator film, a first high concentration region of said second conductivity type formed in contact with said end portion of said channel region to receive said charges transferred by said transferring means from said end portion, a first low concentration region of said second conductivity type provided on one side of said first high concentration region, a second low concentration region of said second conductivity type provided on the side of said high concentration region opposite said first low concentration region, said channel region, said first high concentration region and said first and second low concentration regions having substantially the same depth, a charge drain region formed in contact with said first high concentration region to drain charges in said first high concentration region in response to a reset pulse, a channel stopper region having high concentration impurities of said first conductivity type and formed at the surface of said semiconductor substrate to surround said channel region, said first and second low concentration regions and said charge drain region, said channel stopper region being separated from said first high concentration region by said first and second low concentration regions, said channel stopper region contacting said semiconductor substrate at a depth greater than each of said channel region, said first high concentration region and said first and second low concentration regions, and a means for generating an output by converting a quantity of charges in said first high concentration region into a voltage form.

4,698,657

FET TYPE SENSOR AND A METHOD FOR DRIVING THE SAME

Masanori Watanabe, and Masaya Hijikigawa, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 4, 1985, Ser. No. 697,640
Claims priority, application Japan, Feb. 10, 1984, 59-23598; Mar. 14, 1984, 59-49673
Int. Cl.[4] H04L *29/66*
U.S. Cl. 357—25 **10 Claims**



1. In a field effect transistor-type sensor including an insulated gate field effect transistor device incorporated with a sensitive means for exhibiting a variation in its dielectric constant due to a physical or chemical interaction with the quantity to be detected, said sensitive means being located between the gate insulating film and the gate electrode of said field effect transistor device; the improvement comprising:

an auxiliary electrode located between said gate insulating film and said sensitive means; and

a resistance means connected to said auxiliary electrode and through which a DC bias voltage for stabilizing the operating point of said field effect transistor device is applied to said auxiliary electrode.

4,698,658

AMORPHOUS SEMICONDUCTOR DEVICE

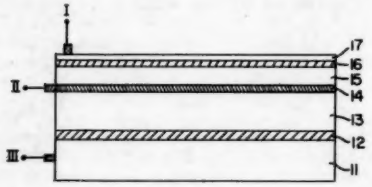
Hitoshi Sannomiya, Osaka, and Masaya Hijikigawa, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 19, 1985, Ser. No. 756,854
Claims priority, application Japan, Jul. 24, 1984, 59-154587
Int. Cl.[4] H01L *27/14*
U.S. Cl. 357—30 **4 Claims**

1. An amorphous semiconductor device for a color sensor comprising:

the following sequentially layered structure on a substrate:

a first doped amorphous silicon layer of a first conductivity,
a first intrinsic amorphous silicon layer,
a second doped amorphous silicon layer of a second conductivity type opposite said first conductivity type,
a second intrinsic amorphous silicon layer,
a third doped amorphous silicon layer of said first conductivity type;



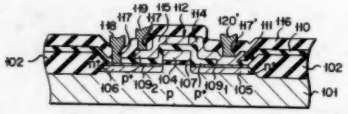
first, second and third electrodes connected respectively to said first, second and third doped amorphous silicon layers;
a first photo diode formed by said first and second doped amorphous silicon layers between said first and second electrodes having a different sensitivity to wavelengths of light than a second photo diode formed by said second and third doped amorphous silicon layers between said second and third electrode.

4,698,659

STACKED COMPLEMENTARY METAL OXIDE SEMICONDUCTOR INVERTER

Yoshihisa Mizutani, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 485,413, Apr. 15, 1983, abandoned. This application May 16, 1986, Ser. No. 865,652
Claims priority, application Japan, May 31, 1982, 57-92923
Int. Cl.[4] H01L *29/78, 27/02, 29/04, 23/48*
U.S. Cl. 357—42 **4 Claims**



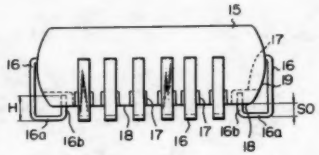
1. A stacked CMOS (Complementary Metal Oxide Semiconductor) inverter comprising:
a semiconductor substrate of a first conductivity type;
an MOS transistor of a second conductivity type including a first source region and a first drain region, which are of said second conductivity type, provided in one of the surface regions of said semiconductor substrate to form a first channel region, a first insulation layer provided on said first channel region, and a gate electrode provided on said first insulation layer;
a second insulation layer for covering the surfaces of said gate electrode, said first source region and said first drain region;
an MOS transistor of said first conductivity type including a semiconductor layer formed on said second insulation layer which has a portion facing said gate electrode and serving as a second channel region, a portion facing said first source region and serving as a second source region of said first conductivity type, and a portion facing said first drain region and serving as a second drain region of said first conductivity type, and said gate electrode, with said second insulation layer, interposed between said gate electrode and said second channel region, being used as a gate insulation layer;
first, second and third connection electrode means for connecting said first and second source regions, said first drain region, and second drain region, respectively, to an exterior circuit;
means for electrically connecting together said first and second source regions while precluding formation of a parasitic diode between said first source region and said first connection electrode means comprising a first conductive layer of a metal silicide interposed directly between said first and second source regions, said first conductive layer covering the entire surface of said first source region, and said source region directly contacting said first conductive layer through a contact hole provided in said second insulating layer; and
a second conductive layer, which is comprised of the same material as said first conductive layer, covering the entire surface of said first drain region.

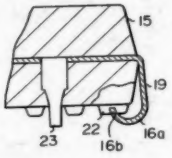
4,698,660

RESIN-MOLDED SEMICONDUCTOR DEVICE

Akihiro Kubota; Tsuyoshi Aoki, both of Kawasaki; Michio Ono, Tokyo, and Rikio Sugiura, Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 478,727, Mar. 25, 1983, abandoned. This application Feb. 12, 1986, Ser. No. 833,535
Claims priority, application Japan, Mar. 30, 1982, 57-052061
Int. Cl.[4] H01L *23/50, 23/00*
U.S. Cl. 357—70 **5 Claims**





1. A resin-molded semiconductor device package, comprising:
a resin-molded main body having a main surface, a plurality of side surfaces and a plurality of grooves formed therein, said grooves being spaced a predetermined distance from each other along edge portions defined by the main surface and the side surfaces of said resin-molded main body, said grooves opening at the main surface and at one of the side surfaces, defining a bottom surface and having a depth measured from the main surface to the bottom surface, the number of said grooves corresponding to the number of said external leads respectively; and
a plurality of external leads extending from said resin-molded main body, having tips and plastically deformable middle portions, and being bent to position the tips of said external leads in said grooves, the tips being spaced apart from each of the corresponding bottom surfaces of the grooves to form gaps, the tips having a height greater than the depth of the grooves, and the middle portions of said external leads being positioned spaced from the plane extending along said main surface forming a predeter-

mined standoff distance, the tips of the external leads contacting the bottom surfaces of the grooves and substantially maintaining the standoff distance after the middle portions of the external leads are plastically deformed by being pressed toward the plane extending along the main surface of the resin-molded main body.

4,698,661

ENCAPSULATING BOX FOR A POWER SEMICONDUCTOR WITH IMPROVED INPUT-OUTPUT INSULATOR

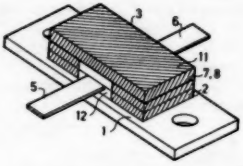
Guy Bessonneau, Marny-les-Hameaux; Bernard Carnez, Magny-les-Hameaux; Henry Derewonko, Les Ulis, and Joël Lepage, Longpont sur Orge, all of France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 799,297, Nov. 20, 1985, abandoned, which is a continuation of Ser. No. 565,812, Dec. 27, 1983, abandoned. This application Jan. 23, 1987, Ser. No. 9,627

Claims priority, application France, Dec. 28, 1982, 82 21860

Int. Cl.[4] H01L *23/02, 23/12*

U.S. Cl. 357—74 **6 Claims**



1. An encapsulating box for power semiconductors operating in the hyperfrequency range comprising:

a metal base for evacuating the heat given off by said power semiconductor, said metal base being electrically grounded;

a ceramic frame supported by said metal base;

a ceramic closing cover covering said ceramic frame and said metal base, said closing cover being fixed to the frame by welding by means of a metal film deposited on the free face of the frame and a metal film deposited on the face of the cover facing the frame;

At least two input and output metallic ribbon connections passing through and fritted to said frame for electrical connection to the power semiconductor, said metallic ribbons and said metal film on the frame creating stray capacitors;

a conductive metal film covering the outer surfaces of the space defined by said frame and said closing cover except in the area immediately surrounding said input and output connectors and which is in contact with the electrical ground and with the metal welding films of the frame and the cover, so as to reflect the signals from said stray capacitors.

4,698,662

MULTICHIP THIN FILM MODULE

Peter L. Young, South Barrington, and Chiu-Chao Chen, Hoffman Estates, both of Ill., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Feb. 5, 1985, Ser. No. 698,472

Int. Cl.[4] H01L *39/02, 23/02*

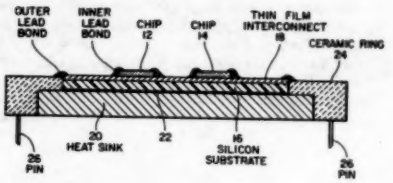
U.S. Cl. 357—80 **12 Claims**

1. A package having improved heat dissipation comprising:

a silicon substrate having a first surface and a second surface;

a plurality of thin film interconnect conductors formed in planes and disposed on said first substrate surface;

a plurality of silicon chips in thermal communication with said first substrate surface; and



a heat sink disposed on said second substrate surface and being in thermal contact therewith.

4,698,663

HEATSINK PACKAGE FOR FLIP-CHIP IC

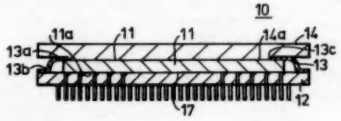
Masahiro Sugimoto, Yokosuka; Yasumasa Wakasugi, and Shigeki Harada, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 3, 1986, Ser. No. 937,414

Claims priority, application Japan, Sep. 17, 1986, 61-218301

Int. Cl.[4] H01L *23/34*

U.S. Cl. 357—81 **14 Claims**



1. A semiconductor device comprising:

a substrate having at least one wiring layer formed on a top surface thereof;

at least one semiconductor element mounted with a top face thereof downward on said substrate and electrically coupled to said wiring layer;

a cap having at least one opening which is smaller than an external size of said semiconductor element, a peripheral portion of said cap being adhered on the top surface of said substrate and a portion of said cap around said opening being adhered on a bottom face of said semiconductor element to thereby hermetically seal said semiconductor element; and

a heatsink member mounted on said cap, said heatsink member having a portion which fits into said opening and makes contact with the bottom face of said semiconductor element.

4,698,664

AUDIO-VISUAL MONITORING SYSTEM

William E. Nichols, San Jose; William F. Herzog, San Martin, both of Calif.; Neil Feldman, Dallas, Tex., and William Laumeister, San Jose, Calif., assignors to Apert-Herzog Corporation, San Jose, Calif.

Filed Mar. 4, 1985, Ser. No. 707,836

Int. Cl.[4] H04N *5/76*

U.S. Cl. 358—10 **22 Claims**

1. A memory array for storing and playing back digital values derived from an analog data stream from a source of real time successive video picture image fields, said memory comprising:

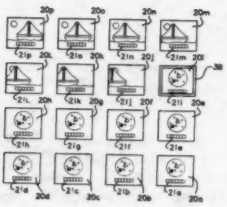
input means for receiving said digital values,

line store means connected to said input means for storing

said digital values which correspond to each incoming line of video,

read/write ring memory array means for storing a plurality of successive video fields comprised of sampled ones of said digital values from said line store means in accordance with a sampling rate which determines the minimum number of successive picture fields to be stored in said memory array means, there being at least one field of each picture frame being stored,

read control means connected to said read/write ring memory array means for cyclically reading said memory array



means during each video line time interval to generate a digital data stream in real time corresponding to said plurality of successive video fields,

write control means connected to said line store means and to said read/write ring memory array means for periodically writing digital values sampled from a current incoming video line in place of digital values sampled from the oldest stored video line,

output means connected so said read/write ring memory array means and to said read control means for putting out said digital data stream.

4,698,665

COLOR TELEVISION TRANSMISSION OR INFORMATION STORAGE SYSTEM, RESPECTIVELY WITH TIME-DIVISION MULTIPLEX CODING AND DATA GENERATOR AND RECEIVER SUITABLE THEREFOR

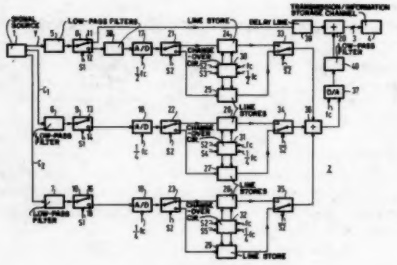
Gerard de Haan, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 17, 1985, Ser. No. 810,441

Claims priority, application Netherlands, Dec. 24, 1984, 8403929

Int. Cl.[4] H04N *11/06*

U.S. Cl. 358—12 **18 Claims**



1. Color television system, respectively with time-division multiplex coding, the system comprising at least one data generator, at least one data receiver and a transmission or information storage channel, respectively, between the generator and the receiver, the data generator comprising at least one signal source for producing signals containing luminance, chrominance, synchronizing and identification information and an encoding circuit for time-division multiplex coding of at least a portion of said signals, which may have been subjected to a change in their time duration, the encoding circuit having an output for supplying a time-division multiplex encoded signal for transmission via the transmission channel or storage in the information storage channel, respectively, the data receiver incorporating a decoder circuit coupled to the said channel and, associated with the said encoding circuit, being suitable for producing signals comprising at least luminance and chrominance information which predominantly corresponds to the information produced by the signal source in the data generator, in the color television signal an image being formed from two or more fields having a predetermined number of lines, characterized in that the encoding circuit supplies from its output a time-division multiplex encoded signal in which during a first field period a first linear combination of the luminance information components of two consecutive lines of a first field of the signal from the signal source and of the luminance information of two consecutive lines of a subsequent, second field of the said signal which on display substantially coincide with said lines of the first field, is present, whereby in the subsequent, second field period of the time-division multiplex encoded signal a second linear combination of said luminance information components, which deviates from the first linear combination is present, the time ratio for signal compression or expansion, respectively of the first linear combination differing from the corresponding ratio of the second linear combination, the ratio defining the ratio between the time durations of a luminance information prior to and after a change in the duration.

4,698,666

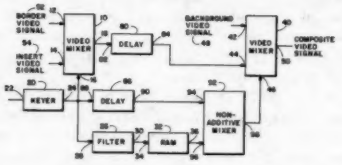
VIDEO KEY GLOW AND BORDER GENERATOR

David E. Lake, Jr., Penn Valley, and Robert L. Miller, Davis, both of Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Jul. 12, 1985, Ser. No. 754,487

Int. Cl.[4] H04N *9/74*

U.S. Cl. 358—22 **30 Claims**



15. Apparatus for producing a composite video image comprised of a glow of a desired color around an insert image in a background video image, comprising:

keyer means responsive to the insert image for producing a key signal having a first state responsive to the insert image, and a second state responsive to the absence of the insert image, and having a time period associated with transitions between the states;

first video mixing means responsive to the desired color, the insert image and the key signal for producing a first video image comprised of the desired color with the insert image placed therein;

a first delay means responsive to the first video image for producing a first delay signal comprised of the first video image delayed by a first preselected amount of time;

a second delay means responsive to the key signal for producing a second delay signal comprised of the key signal delayed by a second preselected amount of time;

filter means responsive to the key signal for increasing the time required for the key signal to change between the states associated therewith;

level translation means responsive to said filter means for

selectively translating levels associated with the key signal to selected levels;

non-additive mixing means responsive to the second delay signal and to said level translation means for producing a non-additive mixer output signal according to the larger of the second delay signal and the selected levels of the key signal; and,

second video mixing means responsive to the first video image, the background video image and the non-additive mixing means for producing the composite video image.

4,698,667

METHOD TO REESTABLISH A PREDETERMINED PHASE RELATIONSHIP OF A CHROMINANCE TV SIGNAL WITH RESPECT TO A REFERENCE

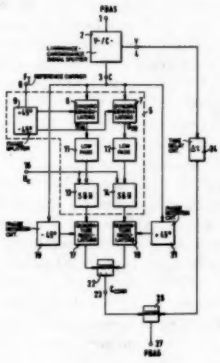
Heinz Hess, Weiterstadt, and Horst Peth, Alsbach-Hähnlein, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 5, 1986, Ser. No. 859,642

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517697

Int. Cl.⁴ H04N *9/64*

U.S. Cl. 358—35 **8 Claims**



1. In the art of television signal processing,

a method to reestablish the phase relationship of an input chrominance signal with respect to a carrier reference signal,

in which two set voltages are derived, corresponding to the phase deviation of the input chrominance signal from the reference carrier signal and said so-derived voltages are stored for the duration of a line scan,

comprising, in accordance with the invention, the steps of

deriving two chrominance derived signals of the carrier frequency, respectively phase shifted by 90° with respect to each other, with reference to the chrominance carrier frequency;

amplitude modulating said chrominance derived signals with the respective set values; and

adding the amplitude modulated chrominance derived signals to thereby match the phase position of the resulting chrominance signal to that of the reference carrier.

4,698,668

APPARATUS FOR INFLUENCING THE PRESENTATION OF VISUAL INFORMATION

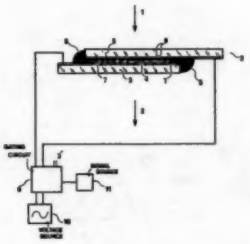
Paul Milgram, Amsterdam, Netherlands, assignor to Canadian Industrial Innovation Centre/Waterloo, Waterloo, Canada

Filed Aug. 26, 1983, Ser. No. 526,647

Claims priority, application Netherlands, Aug. 30, 1982, 8203370

Int. Cl.⁴ H04N *13/00*

U.S. Cl. 358—92 **7 Claims**



1. A shuttering device for disposition in front of an observer, said shuttering device comprising:

a frame;

at least one liquid crystal cell installed in said frame, each said cell comprising two parallel transparent plates arranged face to face with a small space between them, transparent electrically conductive coatings on the facing surfaces of said plates, insulation and sealing means for electrically insulating said conductive coatings on said plates from each other and for enclosing and sealing said small space between said plates, and liquid crystal material filling said sealed space between plates, said liquid crystal material being of the type which undergoes a cholesteric-nematic phase change between a transparent phase when subjected to a electric field across said plates of intensity greater than a critical value and a translucent light-scattering phase when said electric field is removed or reduced to a level lower than said critical value; and

an electrical terminal connected to each said conductive coating for electrical connection whereby an electric field can be applied across said cell to cause said liquid crystal material to change phase from its scattering to its transparent state.

4,698,669

COLOR PICTURE READER AND METHOD FOR OPERATING THE SAME

Hidekazu Sekizawa, Yokohama; Haruko Kawakami, Funabashi, and Naofumi Yamamoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 19, 1985, Ser. No. 810,556

Claims priority, application Japan, Mar. 31, 1985, 60-67856

Int. Cl.⁴ H04N *1/00, 1/46*

U.S. Cl. 358—76 **23 Claims**

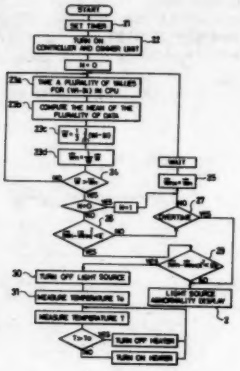
1. A device for reading a color picture by means of a plurality of color separated signals, comprising:

a light source for radiating light on an object to be read,

light receiving means for receiving light which is reflected from the object to be read, and for outputting a plurality of color separated signals based on the light received, and

means for controlling a spectral component of the light from the light source, by comparing a spectral component of

the color separated signals obtained based on the light reflected from a reference plate, with predetermined ref-



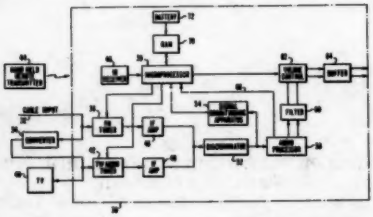
erence values so as to make the difference between the two to be zero.

4,698,670

CABLE STEREO APPARATUS

Thomas C. Matty, N. Huntingdon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 14, 1986, Ser. No. 885,049
Int. Cl.[4] H04N 7/10, 7/06
U.S. Cl. 358—86 **21 Claims**



19. A stereo module unit operable to receive FM signals transmitted by an operator along with TV signals, with a predetermined number of said FM signals to be presented in audio format along with corresponding TV channels, wherein TV-FM assignments are transmitted by the operator as a data signal, comprising:

(A) means for receiving said signals; and

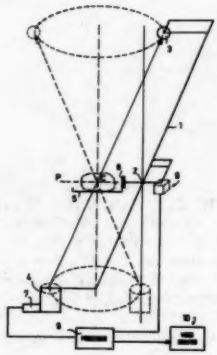
(B) means operable to extract said data signal from the other transmitted signals and to store said assignments so that when a user tunes to a particular TV channel, any assigned FM channel associated with said particular TV channel will be selected for audio presentation.

4,698,671

PROCESS AND APPARATUS FOR GENERATING A TOMOGRAPHIC IMAGE OF A THREE DIMENSIONAL OBJECT

Edgard Garcia, Toulouse, France, assignor to Etablissement Oksman S. A. R. L., Toulouse, France

Continuation-in-part of Ser. No. 555,048, Nov. 25, 1983, abandoned. This application May 28, 1985, Ser. No. 737,869
Claims priority, application France, Nov. 24, 1982, 82 19826
Int. Cl.[4] H04N 5/32; H05G 1/64
U.S. Cl. 358—111 **19 Claims**



1. A process for generating a tomographic image of a three-dimensional object in a sectional plane (P) comprising:

irradiating the object at various angles of incidence (R_1, R_2, . . .) by means of beams converging toward the sectional plane using at least one radiation source (3);

detecting for each angle of incidence, and by means of a transducer (4, 7) having a photosensitive surface, the radiation passed through the object for generating for each of said angles of incidence an electric signal representing an image signal, and

processing the various image signals corresponding to the various angles of incidence for the purpose of emitting a synthesized signal representing the tomographic image, said processing step comprising comparing the values of the different image signals at each image point, selecting the image signal value corresponding to the least radiation attenuation for each image point, storing the selected values comprising the synthesized signal representing the tomographic image, and feeding the stored signal to display means (10) for visualizing the tomographic image.

4,698,672

CODING SYSTEM FOR REDUCING REDUNDANCY

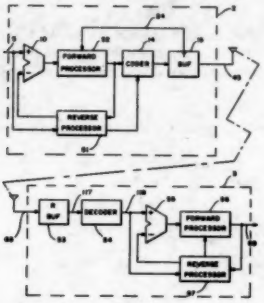
Wen-hsiung Chen, Sunnyvale, and Daniel J. Klenke, Milpitas, both of Calif., assignors to Compression Labs, Inc., San Jose, Calif.

Filed Oct. 27, 1986, Ser. No. 923,630
Int. Cl.[4] H04N 7/133, 7/137
U.S. Cl. 358—136 **46 Claims**

1. A method for processing digital signals, where the digital signals have first values, second values and other values, to reduce the amount of data utilized to represent the digital signals and to form statistically coded signals such that the more frequently occurring values of digital signals are represented by shorter code lengths and the less frequently occurring values of digital signals are represented by longer code lengths, comprising,

forming first runlength code values representing the number

of consecutive first values of said digital signals followed by said second value,



forming second runlength code values representing the number of consecutive first values of said digital signals followed by one of said other values.

4,698,673

VIDEO SIGNAL PROCESSING

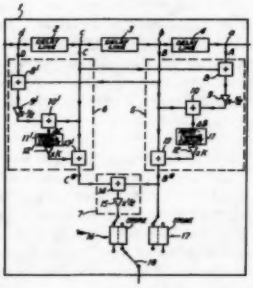
Nigel Johnson, Bagshott, England, assignor to EMI Limited, Hayes, England

Filed Oct. 15, 1985, Ser. No. 787,052

Claims priority, application United Kingdom, Oct. 23, 1984, 8426723

Int. Cl.[4] H04N 7/01

U.S. Cl. 358—140 8 Claims



1. Processing equipment for video signals, the equipment comprising input means to receive video signals, at a line rate, for passage to means to enhance the vertical detail of each of two adjacent scanning lines of video information, means to interpolate the two enhanced scanning lines, and means to combine the video information derived from the said scanning lines, the combiner means including means to switch between an output of the interpolation means and an output of the enhancing means, thereby to produce an increased line rate at the output of the switching means as compared to that at the input means.

4,698,674

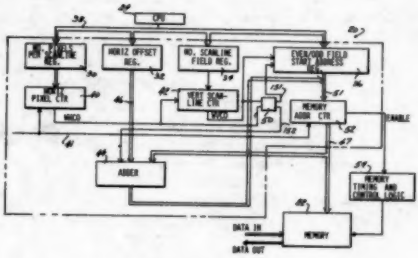
INTERLACE/NON-INTERLACE DATA CONVERTER

Leslie E. Bloom, Ypsilanti, Mich., assignor to VSP, Inc., Ann Arbor, Mich.

Filed Mar. 6, 1986, Ser. No. 836,550

Int. Cl.[4] H04N 7/01

U.S. Cl. 358—140 6 Claims



1. A data converter receiving video interlaced scan line data input and connected to a memory comprising:

means for digitizing the analog input data to digital form;

means for converting interlaced formatted data in separate odd and even numbered scan line fields to non-interlaced, sequential locations in the memory alternating odd and even numbered scan lines of the input video field data; and

means for generating a series of addresses for storing the interlaced formatted data in non-interlaced format in the memory.

4,698,675

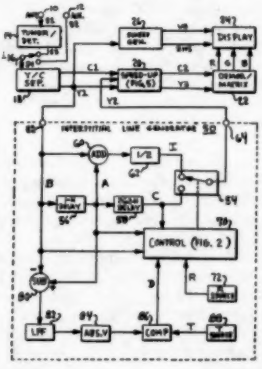
PROGRESSIVE SCAN DISPLAY SYSTEM HAVING INTRA-FIELD AND INTER-FIELD PROCESSING MODES

Robert F. Casey, Burgen County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 29, 1986, Ser. No. 912,631

Int. Cl.[4] H04N 7/01

U.S. Cl. 358—140 13 Claims



1. In a progressive scan display system of the type comprising processor means for deriving a processed video signal for display from a video input signal, speed-up means for time compressing and interleaving lines of said input and processed video signals and display means for displaying the interleaved lines in progressive scan fashion, the improvement characterized in that said processor means comprises:

first means for deriving a line-delayed video signal, a field-delayed video signal, a line-interpolated video signal and a vertical detail signal from said video input signal; and

second means for selecting said field-delayed video signal for application to said speed-up means as said processed video signal when said detail signal is greater than a threshold value and said field-delayed signal is concurrently within a range of values bounded by said input and line-delayed signals and for selecting said line interpolated video signal otherwise.

4,698,676

VIDEO SIGNAL CONTROL CIRCUIT

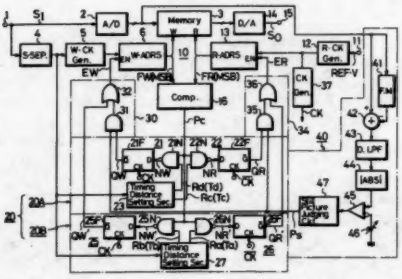
Tatsuya Kubota, and Kenji Takanashi, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 11, 1986, Ser. No. 850,551

Claims priority, application Japan, Apr. 15, 1985, 60-079986

Int. Cl.[4] H04N *7/01*

U.S. Cl. 358—140 **7 Claims**



1. A video signal control circuit having a memory in which an input digital video signal is written and from which a controlled digital video signal is read out, and a memory control circuit, said video signal control circuit comprising:

(A) write address generating means for generating a write address data supplied to said memory, and said input digital video signal being written in the address represented by said write address data;

(B) read address generating means for generating a read address data supplied to said memory, and said controlled digital video signal being read out from the address represented by said read address data;

(C) address comparator means for comparing said write and read address data and for generating a compared output pulse;

(D) timing pulse generating means for generating first and second timing pulses, each of said timing pulses having a predetermined pulse duration;

(E) still picture detecting means supplied with said input digital video signal and for detecting whether said input digital video signal represents a still picture or not;

(F) write address control means supplied with said compared output pulse, said first timing pulse and the output of said still picture detecting means, and for controlling said write address generating means when the pulse duration of said compared output pulse is shorter than that of said first timing pulse and said still picture detecting means detects that said input digital video signal represents a still picture; and

(G) read address control means supplied with said compared output pulse, said second timing pulse and the output of said still picture detecting means, and for controlling said read address generating means when the pulse duration of said compared output pulse is shorter than that of said second timing pulse and said still picture detecting means detects that said input digital video signal represents a still picture.

4,698,677

TELEVISION RECEIVER ARRANGEMENTS

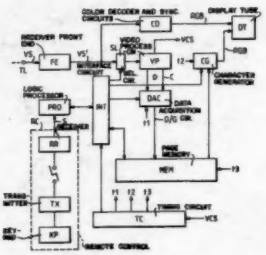
John R. Kinghorn, Sutton, and Richard E. F. Bugg, Coulsdon, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 23, 1984, Ser. No. 663,794

Claims priority, application United Kingdom, Oct. 26, 1983, 8328623

Int. Cl.[4] H04N *7/093*

U.S. Cl. 358—147 **5 Claims**



1. In a television receiver adapted to receive television signals comprising digitally coded data pulses representing teletext information transmitted during television lines in which picture signals representing normal picture information are not present, such television receiver comprising:

acquisition means for acquiring such digitally encoded teletext information, memory means for storing the acquired digital codes, character generator means having a memory in which is stored character information identifying each of the character shapes which the television receiver can display, and a display facility for displaying respective pages of the teletext information; the improvement characterized in that:

said character memory is adapted to store said character information in the form of a common language set of characters together with a plurality of sets of national option characters, any one of such national option character sets being selectively addressable by control bits contained in the received teletext information to form with the common language set a complete language set for displaying a page of the received teletext information in a single language;

said television receiver arrangement further comprising logic processing means responsive to said control bits to address the national option character set in said character memory signified by such control bits; such logic processing means being further adapted to address all of the national option character sets in said character memory, so that more than one of the national option character sets can be used in the display of a single page of the teletext information.

4,698,678

TELEVISION SIGNAL PROCESSING APPARATUS

Mark C. Collins, Basingstoke, United Kingdom, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 22, 1984, Ser. No. 582,627

Claims priority, application United Kingdom, Mar. 10, 1983, 8306606

Int. Cl.[4] H04N *5/04*

U.S. Cl. 358—148 **2 Claims**

1. A television signal processing apparatus comprising:

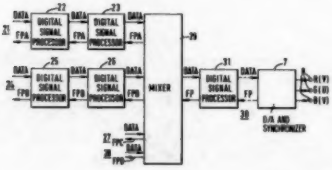
a source of system television synchronizing signals;

analog-to-digital converter means for converting an analog input television signal to a digital television signal organized in a series of frames;

at least one digital television signal processor responsive to said analog-to-digital converter means, at least one of the signal processors being capable of synchronizing said frames of said digital television signal with respect to a frame pulse supplied to said at least one signal processor;

digital-to-analog converter means responsive to said at least one signal processor, there being a signal path extending from said analog-to-digital converter means, through said at least one signal processor to said digital-to-analog converter means;

means associated with said digital-to-analog converter means for producing said frame pulse, for feeding said frame pulse back to said at least one of the signal processors, and for synchronizing said frame pulse with respect to said system television synchronizing signals;



said means associated with said digital-to-analog converter means being operative to adjust the timing of said produced frame pulse with respect to said system television synchronizing signals until said digital television signal is in a predetermined phase relation with said system television synchronizing signals at the input to said digital-to-analog converter means;

a mixer; and

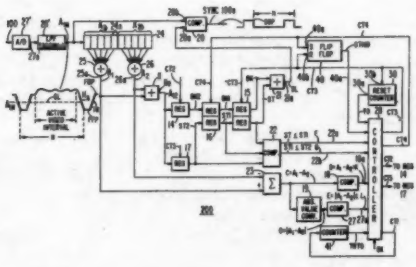
at least one additional signal processor arranged in at least one additional signal path between said analog-to-digital converter means and said mixer, digital signals in respective ones of said signal paths being mixed to derive a mixed digital signal which is supplied to said digital-to-analog converter means, and said produced frame pulse being respectively fed back through each of said signal paths to each of said signal processors therein, so that said signals being mixed by said mixer are all synchronized with each other.

4,698,679

SYNC SEPARATOR

Alvin R. Balaban, Lebanon, and Steven A. Steckler, Clark, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Apr. 30, 1986, Ser. No. 857,331
Int. Cl.[4] H04N *5/08, 5/10*
U.S. Cl. 358—153 **21 Claims**



1. A sync separator apparatus responsive to a video signal that contains synchronizing for generating from said video signal a synchronizing output signal that contains the synchronizing information, comprising:

first means responsive to said video signal for detecting the rate of change in said video signal to generate a first signal that is indicative of the rate of change occurring in said video signal;

second means responsive to said first signal for generating a second signal when said first signal is indicative of the occurrence of a first predetermined rate of change; and

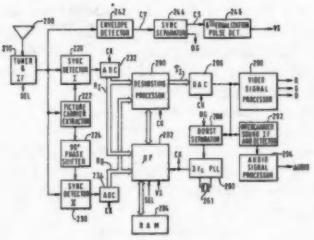
means responsive to said video signal and to said second signal for generating said synchronizing output signal.

4,698,680

DIGITAL CORRELATION APPARATUS AS FOR A TELEVISION DEGHOSTING SYSTEM

Henry G. Lewis, Jr., Hamilton Square, and Sheau-Bao Ng, Plainsboro, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Dec. 24, 1985, Ser. No. 813,396
Int. Cl.[4] H04N *5/14, 5/21*
U.S. Cl. 358—166 **8 Claims**



1. A sampled data signal filtering and correlation system comprising:

an input terminal for applying input signals to the system;

a control terminal for applying a control signal to selectively condition the system to operate as a filtering system or as a correlation system;

means coupled to said input terminal for combining said input signals with correction signals to produce first output signals;

a finite impulse response filter having an input terminal coupled to said combining means, a plurality of terminals for applying filter coefficient values and an output terminal;

means coupled to the output terminal of said filter and to said control terminal for alternatively applying signals provided by said filter to said combining means as said correction signals or to an output terminal as a second output signal, responsive to said control signal conditioning the system to operate as a filtering system and as a correlation system respectively; and

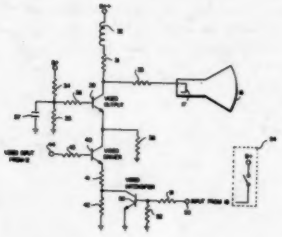
means coupled to said filter for alternatively applying predetermined filter coefficient values or predetermined correlator coefficient values to the coefficient input terminals of said filter conincident with said control signal conditioning the system to operate as a filtering system and as a correlation system respectively.

4,698,681

DUAL INTENSITY VIDEO CIRCUIT

Joseph Kadlec, Berwyn, and Kenneth W. Kociolek, Chicago, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Sep. 11, 1985, Ser. No. 774,671
Int. Cl.[4] H04N 5/235
U.S. Cl. 358—168 2 Claims



1. A highlight circuit for a video display system including a CRT comprising:

a video output transistor having a load resistor for supplying video signals to said CRT;

a video driver transistor coupled in a cascode connection with said video output transistor and having a pair of series connected emitter resistors, said video driver transistor adapted for receiving and inverting an input video signal of varying amplitude;

an intensifier transistor having a base-emitter input circuit adapted to be driven into heavy conduction by a highlight signal and a collector-emitter output circuit connected across one of said emitter resistors; and

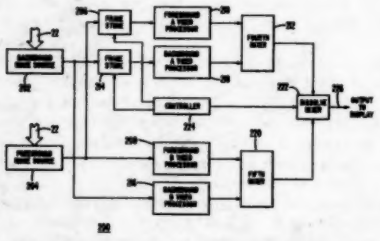
means for supplying said highlight signal for driving said intensifier transistor conductive to short out said one emitter resistor and change the gain of said video output transistor whereby said video output transistor supplies video signals of greater magnitude to said CRT without substantially affecting its ability to track said varying amplitude input signal.

4,698,682

VIDEO APPARATUS AND METHOD FOR PRODUCING THE ILLUSION OF MOTION FROM A SEQUENCE OF STILL IMAGES

Brian Astle, Middlesex County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 5, 1986, Ser. No. 836,413
Int. Cl.[4] H04N 5/262
U.S. Cl. 358—182 12 Claims



1. Apparatus for generating a montage video signal providing an illusion of continuous motion from sequences of related discontinuous still images, said apparatus comprising:

a source of first sequences of related discontinuous still images;

a source of other still images unrelated to said first sequences of still images;

a first mixer for generating said montage video signal at an output port thereof responsive to first and second component video signals applied respectively to a first input port thereof and to a second input port thereof;

a first image processor for generating said first component video signal responsive to said first sequences of still images, said first image processor consecutively considering successive pairs of each said first sequence of still images during respective series of raster scans and cross-dissolving in respective series of steps from one of the still images of each pair to the next, one step per raster scan, thereby to generate said first component video signal; and

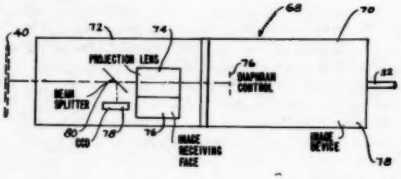
means responsive to said other still images for generating said second component video signal.

4,698,683

VIDEO CONVERSION KIT FOR PROJECTORS

Morris Schwartz, 6455 La Jolla Blvd., La Jolla, Calif. 92037, and Edward K. Kaprelian, 15 Lowery La., Mendham, N.J. 07945

Filed Jul. 28, 1986, Ser. No. 890,106
Int. Cl.[4] H04N 3/36
U.S. Cl. 358—214 12 Claims



1. A conversion kit for converting a conventional projector having an illumination system including a lamp of given power, a film and slide handling section and a projection lens into a projector for selectively coupling to either a video recorder or to a television receiver, comprising a first module consisting of a replacement illumination system including a lamp of lower power, and a second, imaging module which replaces the projection lens and which includes an electronic imaging device which receives on its light sensitive surface an image of a film in the film handling section via a relay lens between said film and said light sensitive surface, and means for selectively transmitting the electrical signals from the imaging device to either of said video recorder or a said television receiver.

4,698,684

CATHODOCHROMIC CRT ERASURE AND TUBE SET UP METHOD

Lee T. Todd, Jr., and Cornelius J. Starkey, IV, both of Lexington, Ky., assignors to Hilliard-Lyons Patent Management, Inc., Louisville, Ky.

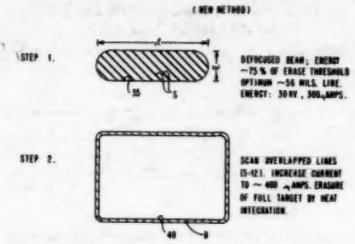
Filed Oct. 18, 1985, Ser. No. 788,973
Int. Cl.[4] H04N 3/16, 5/74
U.S. Cl. 358—237 15 Claims

1. The method of erasure of an image target in a cathodochromic cathode-ray tube comprising the steps of

projecting a defocused electron beam onto a phosphor image layer of said image target thereby forming a single scan line;

establishing an energy level of said defocused electron beam

sufficiently below an erase threshold to prevent erasure of any portion of the image target within any single scan line; scanning multiple lines across the full image target; and



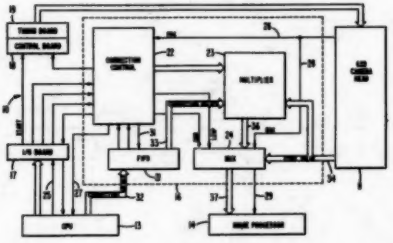
overlapping the multiple scan lines sufficiently to provide integrated heat energy along the multiple scan lines of the image target to cause erasure.

4,698,685

APPARATUS AND METHOD FOR CORRECTING CCD PIXEL NONUNIFORMITIES

Gregory K. Beaverson, Wrightsville, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed May 28, 1986, Ser. No. 867,432
Int. Cl.[4] H04N *5/14, 5/30*
U.S. Cl. 358—213.15 **8 Claims**



1. A method of correcting for nonuniformities of the pixels of a charge coupled device (CCD) utilized in a system having a camera for imaging objects onto said CCD whereby the pixels of said CCD are charged to various pixel levels, comprising the steps of:

storing an individual correction value for every pixel of said CCD in a central processing unit (CPU);

transferring said pixel levels from said CCD to a multiplier;

temporarily storing said correction values in a temporary storage unit;

transferring said correction values from said temporary storage unit to said multiplier in synchronization with the transfer of said pixel levels whereby every pixel level is multiplied by an individual correction value to produce a corrected pixel value for every pixel of said CCD; and

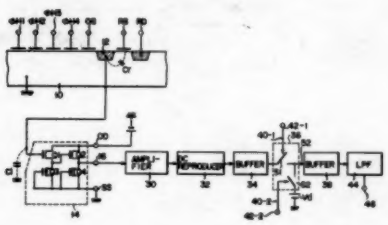
transferring said corrected pixel values to an image processing unit.

4,698,686

IMAGE-SENSING SYSTEM WITH NOISE ELIMINATOR

Yukio Endo; Nozomu Harada, and Okio Yoshida, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1984, Ser. No. 661,683
Claims priority, application Japan, Oct. 18, 1983, 58-195080
Int. Cl.[4] H04N *3/14*
U.S. Cl. 358—213.18 **12 Claims**



1. An image sensing apparatus comprising:

(a) image sensor means for receiving an incident image light to generate an electrical CCD output signal, said image sensor means including a solid-state image sensor device which has,

a substrate,

a photosensing picture element section formed on said substrate for photoelectrically converting the image light to produce one set of signal carriers,

a carrier detecting section formed on said substrate so as to be electrically floating, said carrier detecting section receiving the signal carriers transmitted thereto,

sense amplifier circuit means for detecting the variation in a voltage due to the transfer of said carriers into said carrier detecting section, thereby outputting a detection signal, and

resetting means formed on said substrate, for resetting the potential of said carrier detecting section to a predetermined potential at every read-out period of said photosensing picture element section;

(b) noise eliminating means, additionally connected to said image sensor device, for dividing one picture element period of the CCD output signal into a first period during which an effective image signal component is generated and a second period during which a reset noise component generated in said resetting means is mixed with the CCD output signal, and for forcibly fixing a level of the CCD output signal to a DC reference voltage during said second period to remove the reset noise from the CCD output signal, said noise eliminating means comprising a double equilibrium differential transistor circuit having,

a first differential pair serving as a first switch device for performing a switching operation to allow the transmission of said CCD output signal therethrough during said first period and for cutting off said CCD output signal during said second period, and

a second differential pair serving as a second switch device for carrying out a switching operation to output said DC reference voltage from an output thereof during said second period.

4,698,687

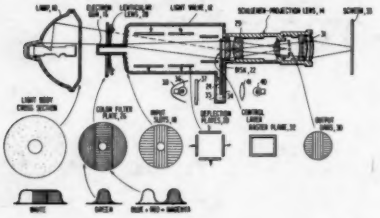
TEMPERATURE CONTROL OF LIGHT MODULATING FLUID IN A LIGHT VALVE PROJECTION SYSTEM

Sherman L. Levin, Williamsville, N.Y., assignor to General Electric Company, Princeton, N.J.

Filed Jan. 6, 1986, Ser. No. 816,599
Int. Cl.[4] H04N *5/66*
U.S. Cl. 358—230 **10 Claims**

1. A light valve projector system in which information is

impressed on a light modulating fluid overlying a disk wherein incident visible light is modulated by the information and projected onto a viewing screen, said disk rotating within a glass envelope which forms a reservoir for said light modulating fluid through which said disk rotates in order to deposit a control layer of said fluid on said disk, the control layer being rotated to a raster area within which the information is written by the deposition of electric charge along scanning lines so as



to form orthogonally related diffraction gratings, and infra-red heating means external to said envelope and positioned adjacent said reservoir for heating said fluid, wherein said heating means provides radiation at wavelengths which are transmitted through said envelope without producing thermal stress in said envelope and at wavelengths which heat said light modulating fluid to control the viscosity and light transfer characteristic thereof.

4,698,688

IMAGE PROCESSING SYSTEM

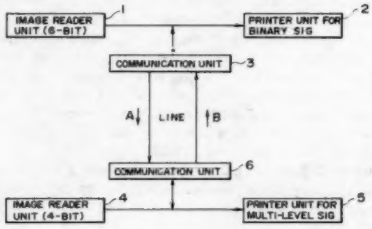
Hiroshi Ochi; Nobuji Tetsutani, both of Yokosuka; Tetsuji Yamamoto, Yokohama; Shigehisa Kitani, Chigasaki, and Asao Watanabe, Kurume, all of Japan, assignors to Nippon Telegraph and Telephone Corporation and Canon Kabushiki Kaisha, both of Tokyo, Japan

Filed Jul. 8, 1985, Ser. No. 752,720

Claims priority, application Japan, Jul. 11, 1984, 59-142260

Int. Cl.[4] H03M *7/04, 7/30;* **H04N** *1/32, 1/40*

U.S. Cl. 358—257 **5 Claims**



1. An image processing system comprising:

means for generating N-bit image data; and

means for converting the N-bit image data generated from said generating means into M-bit (M>N) image data, wherein

said converting means forms the M-bit image data in such a manner that an upper (M−N) bit component of the N-bit image data is added to the N-bit image data as a lower bit component.

4,698,689

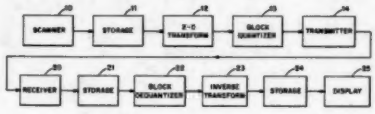
PROGRESSIVE IMAGE TRANSMISSION

Kou-Hu Tzou, Bedford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 28, 1986, Ser. No. 845,739

Int. Cl.[4] H04N *1/00, 7/12*

U.S. Cl. 358—260 **35 Claims**



1. The method of progressively transmitting an image comprising

dividing an image into a predetermined array of zones of picture elements;

performing a predetermined spatial domain-to-transform domain transformation of the picture elements of each zone to provide a set of transform coefficients thereof;

producing and transmitting for each zone during the first of a plurality of transmission sequences signals containing data representing several of the transform coefficients of the set in different degrees of detail; and

producing and transmitting for each zone during each subsequent sequence of said plurality of sequences signals containing data on several of the transform coefficients of the set which when combined with data transmitted during preceding sequences provide cumulative data representing the set of transform coefficients of the zone in different degrees of increasingly finer detail.

4,698,690

IMAGE SIGNAL PROCESSOR

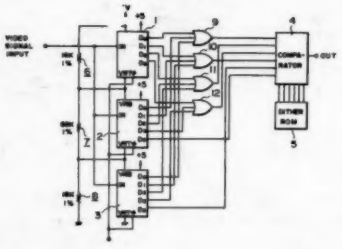
Hiroshi Tanioka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 23, 1984, Ser. No. 633,295

Claims priority, application Japan, Jul. 28, 1983, 58-138552

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—283 **15 Claims**



1. An image signal processor comprising:

input means for entering an analog video signal representing a density of an image;

means for converting the analog video signal fed from said input means to a digital video signal having a plurality of bits, said converting means having a plurality of analog-to-digital converters to which the analog video signal is applied on a parallel basis, said plurality of analog-to-digital converters being biased with mutually different reference voltage values so as to convert the analog video signal into the digital video signal on a non-linear characteristic basis; and

processing means for performing processing for halftone

reproduction on the digital video signal from said converting means.

4,698,691

HALFTONE IMAGE PROCESSING METHOD

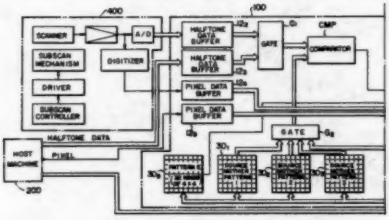
Koichi Suzuki, Yokohama; Noboru Murayama, Tokyo; Masahiro Ito, Kawasaki, and Kei Sato, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 26, 1984, Ser. No. 674,870

Claims priority, application Japan, Nov. 24, 1983, 58-221247

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—283 15 Claims



1. A half-tone image processing method for providing image information in a bit distribution, comprising the steps of:

supplying tone data indicative of a recording density;

establishing a plurality of matrix pattern groups, each group having a plurality of matrix patterns with one matrix pattern for each tone level; the matrix patterns of the same tone level in different groups having the same number of image pixels, but with the pixels being arranged differently in the matrix;

selecting a matrix pattern group from said plurality of matrix pattern groups;

specifying one matrix pattern from said selected matrix pattern group by group designation data and tone data;

whereby information in the specified matrix pattern is provided as bit distribution image information associated with the tone data.

4,698,692

RADIATION GENERATING APPARATUS AND METHOD

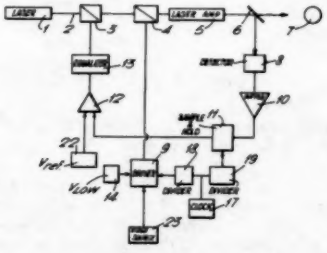
Richard L. Fry, London, and Richard J. Beaumont, Bedfordshire, both of United Kingdom, assignors to Crosfield Electronics (USA) Limited, London, England

Filed Oct. 4, 1985, Ser. No. 784,004

Claims priority, application United Kingdom, Oct. 9, 1984, 8425425

Int. Cl.[4] H04N *1/22*; G01D *9/42*

U.S. Cl. 358—299 11 Claims



1. A method of generating a modulated beam of radiation, the method comprising generating a beam of coherent radiation; generating a chopped control function which chops between two levels, one of said levels comprising a reference level; modulating said beam at a first position in response to said chopped control function; sampling said radiation beam at a sampling position downstream of said first position and generating a feedback function related to the power of said sampled radiation; and modulating said beam at a second position upstream of said sampling position in response to said feedback function to maintain at a substantially constant level said power of said sampled beam when said chopped control function is at said reference level.

4,698,693

AUDIO MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS UTILIZING FREQUENCY MODULATION

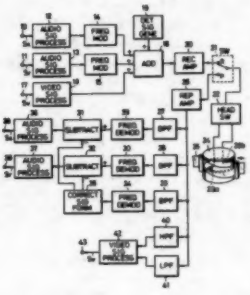
Yukinobu Ishigaki, Machida; Yasuomi Namiki, Yokohama; Hisashige Fujiwara, Yokohama, and Kazutoshi Hirohashi, Yokohama, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Apr. 26, 1985, Ser. No. 727,757

Claims priority, application Japan, Apr. 28, 1984, 59-87320; May 14, 1984, 59-96267

Int. Cl.[4] H04N *5/782*

U.S. Cl. 358—310 16 Claims



1. A rotary head type magnetic recording apparatus comprising:

recording means for recording a recording signal on a magnetic recording medium by rotary heads;

frequency modulating means for obtaining a frequency modulated audio signal by frequency-modulating a carrier by an audio signal which is to be recorded;

detection signal generating means for generating a frequency drift detection signal having a constant frequency which does not exist within a frequency range occupied by said frequency modulated audio signal; and

supplying means for obtaining a frequency multiplexed signal by frequency-multiplexing the frequency modulated audio signal from said frequency modulating means and the frequency drift detection signal from said detection signal generating means and for supplying the frequency multiplexed signal to said recording means as the recording signal.

4,698,694
VIDEO SIGNAL PROCESSING APPARATUS FOR VIDEO TAPE RECORDERS

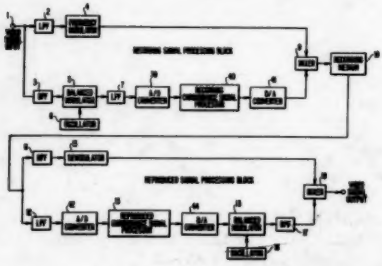
Masao Tomita, Neyagawa, and Akio Hashima, Kyoto, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Mar. 19, 1984, Ser. No. 591,333

Claims priority, application Japan, Mar. 18, 1983, 58-46218; May 10, 1983, 58-82036; Jun. 20, 1983, 58-111223; Jun. 24, 1983, 58-114529

Int. Cl.[4] H04N *9/80*

U.S. Cl. 358—326 **21 Claims**



1. A video signal processing signal for recording a video signal onto a recording medium and for reproducing the recorded video signal from said recording medium, comprising:

a first separating means for separating an input video signal into a luminance signal and a chorminance signal;

a second separating means for separating a reproduced signal from said recording medium into a reproduced luminance signal and a reproduced chrominance signal;

an analog luminance signal processing means for processing said luminance signal from said first separating means in an analog form so as to produce a recordable luminance signal and for processing said reproduced luminance signal from said second separting means in an analog form so as to produce an original luminance signal;

a digital chrominance signal processing means for digitally processing said chrominance signal from said first separating means so as to rpoduce a recordable chrominance signal and for digitally processing said reproduced chrominance signal from said second separating means so as to produce an origianl chrominance signal;

a first mixing means for mixing said recordable luminance and chrominance signals, the mixed recordable signal being recorded in an analog form on said recording medium; and

a second mixing means for mixing said original luminance and chrominance signals to produce an original video signal.

4,698,695
RECORDING DISK DATA PLAYBACK APPARATUS

Minoru Kosaka, and Tutomu Banno, both of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 16, 1985, Ser. No. 776,707

Claims priority, application Japan, Sep. 14, 1984, 59-193701

Int. Cl.[4] H04N *5/76;* **G11B** *7/00, 19/20*

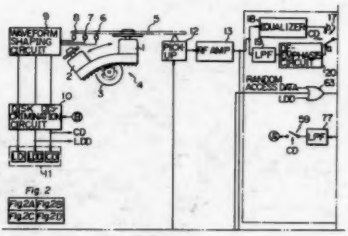
U.S. Cl. 358—338 **1 Claim**

1. A recording disk data playback apparatus capable of playback of a first type of recording disk having a signal recorded thereon which has been frequency modulated by a video signal and audio signal respectively, with first data which has been converted to a pulse train by digital modulation being superimposed thereon, and a second type of recording disk having recorded thereon second data which has been subjected to digital modulation processing to be converted to a pulse train, the apparatus comprising:

demodulator means for demodulating a playback digital signal;

write-in means for writing the demodulated output from said demodulator means into a memory in synchronism with a playback clock signal which is contained in said playback digital signal;

clock signal generating means for generating a read-out clock signal, for reading out stored data from said memory;



phase synchronization means for synchronizing the output from said clock signal generating means with said playback clock signal;

drive means for controlling the speed of rotation of said second recording disk on the basis of an output from said phase synchronization means;

means for inhibiting phase synchronization of said clock signal generating means by said phase synchronization means and for fixing the frequency of said read-out clock signal during playback of said second recording disk, and ;

means for inhibiting speed control by said drive means during playback of said first recording disk.

4,698,696
NOISE REDUCTION CIRCUIT FOR VIDEO TAPE RECORDING AND PLAYBACK APPARATUS

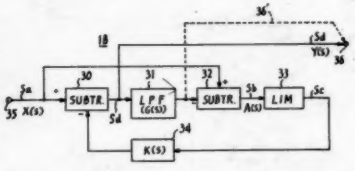
Yasutoshi Matsuo, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed Mar. 11, 1986, Ser. No. 838,552

Claims priority, application Japan, Mar. 13, 1985, 60-49609

Int. Cl.[4] H04N *5/76, 5/21*

U.S. Cl. 358—340 **11 Claims**



1. A noise reduction circuit for reducing noise contained in a luminance signal reproduced from a record medium, comprising:

a first subtractor having a first input terminal to which said luminance signal is applied and a second input terminal;

a low-pass filter for passing therethrough a low-frequency component of an output signal from said first subtractor;

a second subtractor having a first input terminal to which said luminance signal is applied and a second input terminal to which the output of said low-pass filter is applied;

a limiter connected to the output of said second subtractor; and

a feedback circuit coupling the output of said limiter to the second input terminal of said first subtractor.

4,698,697

METHOD AND SYSTEM FOR RECORDING VIDEO INFORMATION WITH A PHASE CONTROL OPERATION BY WHICH A PHASE VALUE OF A RECORDING RF SIGNAL OF EACH 1H PERIOD IS DESIRABLY ADJUSTED

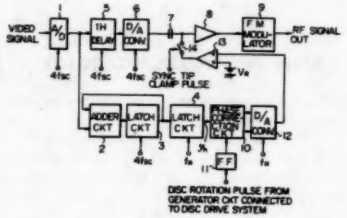
Takashi Okano, Tokorozawa, Japan, assignor to Pioneer Video Corporation, Yamana, Japan

Continuation of Ser. No. 490,126, Apr. 29, 1983, abandoned. This application Sep. 10, 1986, Ser. No. 906,626

Claims priority, application Japan, May 1, 1982, 57-074222

Int. Cl.[4] H04N 5/92

U.S. Cl. 358—340 **7 Claims**



3. A recording medium on which video information is recorded comprising:

a recording disc having spiral or concentrically shaped recording tracks thereon;

said video information being recorded on said recording tracks of said recording disc; and,

said video information recorded on one section of said recording tracks as compared with said video information recorded on another neighbouring section of said recording tracks having the following characteristic:

the absolute value of the difference between the cumulative value of the phase of the video information signal in a 1H period recorded on said one section and the cumulative value of the phase of the video information signal in a corresponding 1H period recorded on said neighbouring section being maintained at a value $(2m+1)\pi$ (m being a positive integer including 0).

4,698,698

DIGITAL TELEVISION SIGNAL PROCESSING APPARATUS

Mark C. Collins, Foxton, United Kingdom, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 11, 1985, Ser. No. 700,872

Claims priority, application United Kingdom, Feb. 22, 1984, 8404681

The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.

Int. Cl.[4] H04N 5/76

U.S. Cl. 360—10.1 **11 Claims**

1. Digital television signal processing apparatus comprising:

a field store arrangement comprising first, second and third field stores each capable of storing digital signals relating to one field of a television signal;

means to supply a digital television signal at a variable rate to said field store arrangement;

means to supply said digital television signal to at least one of said field stores for writing therein, depending on said rate of supply of said digital television signal;

means to read said stored digital television signal from at least one of said field stores, depending on said rate of supply of said digital television signal, no said field store being written into at the same time that it is read from; and

means to rotate said writing and reading around said field stores cyclically; each of said field stores being formed of a plurality of field store units and respective said field store units of each of said field stores being grouped together to receive said digital television signal via a common input.

4,698,699

HEAD POSITIONING SIGNAL GENERATING APPARATUS WITH SIGNAL DURATION CONTROL

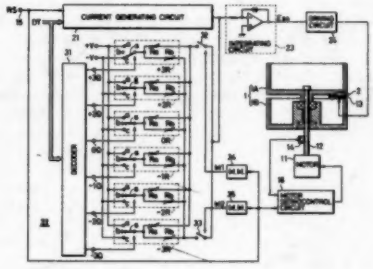
Hitoshi Sakamoto, and Takayuki Okafuji, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 24, 1985, Ser. No. 694,300

Claims priority, application Japan, Jan. 27, 1984, 59-13910

Int. Cl.[4] H04N 5/783; G11B 5/592

U.S. Cl. 360—10.2 **10 Claims**



1. An apparatus for reproducing a video signal comprising:

rotary magnetic head means for reproducing a video signal recorded in slant tracks on a magnetic tape,

rotatable means for rotating said rotary magnetic head means to cause the same to scan the magnetic tape intermittently along the oblique path thereon,

head supporting means attached to said rotatable means for supporting said rotary magnetic head means to rotate in accordance with rotation of said rotatable means, said head supporting means being operative to cause a positional shift of said rotary magnetic head means in a direction of an axis of rotation thereof in response to the level of a control signal supplied thereto in selected reproducing mode of the apparatus, said head supporting means having a predetermined resonant frequency that causes it to undergo swinging movements upon changes in slope of said control signal, and

signal generating means for producing said control signal in said selected reproducing mode and having a first level variation for causing said head supporting means to perform said positional shift for deviating the rotary magnetic head means from a reference position during a period in which said rotary magnetic head means scans the magnetic tape and having second and third level variations occurring successively for causing said head supporting means to perform said positional shift for bringing back said rotary magnetic head means to said reference position during a time in which said rotary magnetic head means is

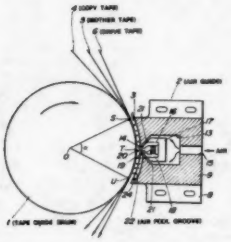
not in contact with the magnetic tape, said second level variation having steep slope relative to said third level variation and having a time duration substantially corresponding to a period of said resonant frequency of said head supporting means.

4,698,700

AIR GUIDE FOR TAPE COPYING APPARATUS

Toshio Shirai, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 29, 1986, Ser. No. 867,951
Int. Cl.[4] G11B *5/86, 5/008*
U.S. Cl. 360—16 **9 Claims**



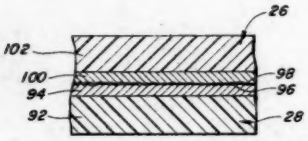
1. In a tape signal copying apparatus having:
(a) a tape guide member for guiding at least a mother tape and a copy tape along a tape guide surface thereof; and
(b) an air guide member having a wall facing the tape guide surface of said tape guide member and formed with an air blow-off slit for blowing air against an outer one of said mother and copy tapes against the tape guide surface of said tape guide member at a copying location during a copying operation, the improvement comprising an air pool groove communicating with the air blow-off slit and formed in said wall of said air guide member facing said tape guide surface, and wherein said air pool groove begins at the air blow-off slit and extends therefrom in a direction of travel of said mother tape and copy tape to an end surface formed in said wall of said air guide member, whereby air from said blow-off slit in said air pool groove urges said mother tape and copy tape against said tape guide member in an area where signals have been copied.

4,698,701

HIGH SPEED THERMOMAGNETIC TAPE DUPLICATION

John E. Gantzhorn, Jr., Hockessin, Del.; John W. McCloud, II, Elkton, Md., and Robert O. Uhler, Malvern, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 4, 1986, Ser. No. 848,091
Int. Cl.[4] G11B *5/86*
U.S. Cl. 360—16 **26 Claims**



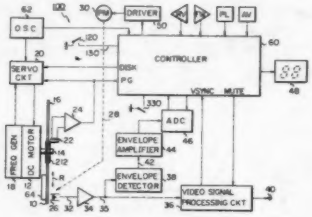
1. A process for the thermal replication of magnetic tape, capable of replicating tapes at speeds in excess of approximately 2.5 meters/sec. consisting essentially of:
(a) contacting the surface of a first magnetic layer comprising magnetic particles in a binder coated on a first supporting web with the surface of a second magnetic layer which also comprises magnetic particles in a binder coated on a second supporting web, the first and second surfaces of the magnetic layers having a combined measurement of roughness in excess of approximately 0.025 micrometers, the second magnetic layer bearing a magnetic pattern, under pressure exerted thereon through a fluid medium, said pressure having a generally wedge shaped profile with a peak extending substantially across the full width of the magnetic layers;
(b) exposing the first magnetic layer to a high intensity beam of radiant energy for a time sufficient to raise the temperature of the magnetic particles in said layer to a temperature above its Curie temperature, while maintaining said fluid pressure;
(c) cooling said first layer, while in contact with the second layer, to a temperature below the Curie temperature of the magnetic particles in said first layer while maintaining said fluid pressure; and
(d) separating the two layers.

4,698,702

PLAYBACK APPARATUS FOR ROTARY RECORDING MEDIUM

Izumi Miyake, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 31, 1985, Ser. No. 739,853
Claims priority, application Japan, May 31, 1984, 59-109586
Int. Cl.[4] H04N *5/781;* **G11B** *21/08*
U.S. Cl. 360—33.1 **10 Claims**



1. Playback apparatus for a rotary recording medium comprising:
playback head means for sensing signals from a plurality of tracks which are recorded on a rotary recording medium in such a manner that a front end of recording operation positionally continues to a last end thereof;
head move means for movably supporting said playback head means over said recording medium;
envelope detect means for detecting an envelope of signals sensed by said playback head means; and
control means, operative in response to said envelope detect means, for controlling said head move means to move said playback head means onto a desired one of the plurality of tracks on the basis of the detected envelope;
said control means, while controlling said head move means to move said playback head means in a first direction, determining the distance over which said playback head has moved with reference to a first predetermined reference position;
said control means controlling said head move means to move said playback head means in a second direction opposite to the first direction when an envelope of signals is not detected by said envelope detect means at a predetermined number of successive track positions and then inhibiting said head move means from moving said playback head means into an area in which a track is not recorded.

4,698,703

CAPSTAN SERVO SYSTEM

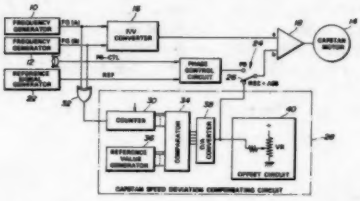
Kazuhisa Nishimura; Mitsugu Yoshihiro; Masaaki Sakai, and Seiichi Hatsoka, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 22, 1986, Ser. No. 887,954

Claims priority, application Japan, Jul. 23, 1985, 60-162274; Nov. 13, 1985, 60-254525

Int. Cl.[4] G11B *15/46*

U.S. Cl. 360—73 **13 Claims**



1. A capstan servo system for a video tape recorder, comprising:

means for generating pulse trains in response to rotation of a tape capstan;

means for controlling a rotation speed of said tape capstan by a control signal having a corresponding magnitude to frequency variation of said pulse trains;

means for producing a phase error between a reference pulse and a control track pulse that is recorded in a longitudinal direction of tape;

means connected to said generating means for detecting a deviation of said pulse trains from a reference value at every predetermined period; and

switching means for supplying output of said producing means to said controlling means in a reproducing mode of said video tape recorder and supplying output of said detecting means to said controlling means in a recording mode thereof.

4,698,704

AUTOMATIC CASSETTE TAPE RECORDER STOP MECHANISM

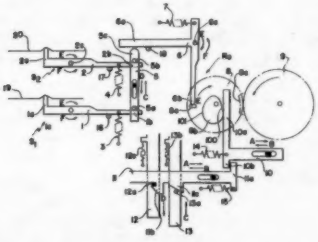
Satoru Koizumi; Daisuke Teshima, and Yoshio Katayama, all of Higashi Hiroshima, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 14, 1986, Ser. No. 851,465

Claims priority, application Japan, Apr. 17, 1985, 60-57120[U]

Int. Cl.[4] G11B *15/22*

U.S. Cl. 360—74.1 **7 Claims**



1. In a tape recorder capable of accommodating a plurality of magnetic tapes and driving each tape individually or two or more tapes simultaneously, an automatic stop apparatus for automatically stopping the magnetic tape operation, comprising:

lock means which is locked while the tapes are being driven;

sensor means provided for each of the tapes to detect the state of the tape;

means for unlocking said lock means to stop the tape operation in response to the output of said sensor means; said unlocking means including a lever which is acted on independently by each said sensor means and a trigger lever which is acted on by said lever; and

output prohibiting means provided for each of the sensor means to prevent the output of said sensor means from being transmitted to said unlocking means when the tape is running.

4,698,705

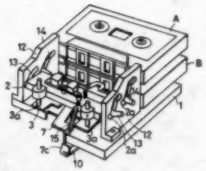
TAPE DOUBLE-CASSETTE RECORDER

Kunio Umino, Yamanashi, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano and Tokyo Pigeon Co., Ltd., Tokyo, both of, Japan

Filed Sep. 16, 1985, Ser. No. 776,341

Int. Cl.[4] G11B *15/68*

U.S. Cl. 360—92 **8 Claims**



1. A double-cassette tape recorder, comprising:

(a) an elongate base plate (**2**) having guide pins (**2***a*) extending outwardly from opposite ends thereof,

(b) a pair of spaced magnetic heads (**16, 17**) and a pinch roller (**18**) mounted on said base plate,

(c) means (**3, 4, 5**) for controllably displacing said base plate frontwardly and rearwardly relative to a magnetic tape accessing position,

(d) an upper recording tape cassette (A) and a lower reproducing tape cassette (B) diposed in a stacked manner one atop the other,

(e) means (**11**) for retaining said upper and lower cassettes in said stacked manner, comprising at least one arm (**32***c*) for engaging and depressing an upper surface of said lower cassette and for maintaining a predetermined space between reduced thickness rear portions of said stacked lower and upper cassettes,

(f) a pair of guide means (**12**) flanking opposite ends of said base plate, each guide means having chevron-shaped slots (**13, 14**) receiving said guide pins for guiding movements of said base plate between said upper and lower cassettes, and

(g) electromagnetic drive means (**6**) for driving said displacing means.

4,698,706

REVERSIBLE DRIVE MECHANISM FOR A MAGNETIC TAPE IN A MAGNETIC TAPE RECORDER

Richard B. Kilstofte, Long Beach, Calif., assignor to Fortel, Inc., Compton, Calif.

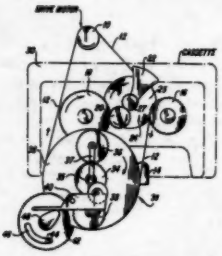
Continuation-in-part of Ser. No. 677,991, Dec. 4, 1984, abandoned. This application Jul. 21, 1986, Ser. No. 887,655

Int. Cl.[4] G11B *15/24, 15/29*

U.S. Cl. 360—96.4 **4 Claims**

1. A mechanism for controlling the magnetic tape in a cassette-type tape recorder, and which includes: a reversible drive motor; a rotatable drive capstan for the magnetic tape; a mem-

ber affixed to the capstan and rotatable about the axis of rotation of the capstan, said member being mechanically coupled to the drive motor to be rotated in a first and second direction about the axis of rotation of said capstan; a drive gear attached to said member for rotation thereby about said axis of rotation; first and second idler gears, and a freely rotatable support bracket mounted on said capstan for angular movement about said axis of rotation of said capstan and supporting said first and second idler gears in coupled relationship with said drive gear; a spring-biased pinch roller assembly; means pivotally mounting said pinch roller assembly adjacent to said capstan for angular movement about an axis of rotation displaced from



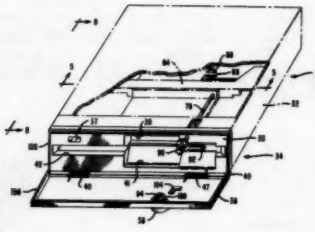
the axis of rotation of said capstan; a further gear rotatably mounted about an axis displaced from said axis of rotation of said capstan to be engaged selectively by said first and second idler gears as said bracket is turned by centrifugal force to first and second positions as said member rotates in said first and second directions, said further gear having a gear hiatus of a particular arcuate length; and a cam attached to said further gear to be turned thereby as said further gear is moved angularly by said first and second gears, said cam engaging said pinch roller assembly to move said pinch roller assembly out of engagement from said capstan against the spring bias thereof when said further gear is turned by one of said idler gears in a particular direction.

4,698,707

PROTECTIVE COVER FOR HOUSING FOR DATA PROCESSING MECHANISM

George Heys, Jr.; Rex A. Aleshire, and Harold J. Sampson, all of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Oct. 15, 1985, Ser. No. 787,356
Int. Cl.[4] G11B *5/016, 5/012;* **A47B** *81/00;* **A47G** *19/26*
U.S. Cl. 360—99 **18 Claims**



1. A protective cover for a housing for a data processing mechanism comprising:

a cover element movable between an open position and a closed position in which said cover element covers one portion of said housing;

hinge means for hinging one edge of said cover element to said housing;

operating means rotatably mounted on said one portion of said housing and operable to control said data processing mechanism within said housing;

manually operable actuating means rotatably mounted on said cover element and only engageable with said operating means when said cover element is in closed position;

latch means fixed to said operating means and rotatable therewith; and

latch receiving means fixed to the inner surface of said cover element for engaging said latch means;

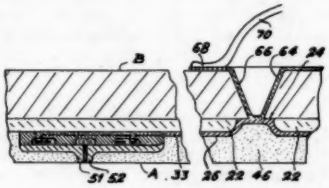
whereby when said cover element is closed, manual movement of said actuating means causes said operating means to control said data processing mechanism within said housing and concurrently also causes said latch means to retain said cover element in closed position.

4,698,708

DEVICE FOR MAGNETICALLY READING AND WRITING ON A FLYING SUPPORT

Jean-Pierre Lazzari, Corenc, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 30, 1985, Ser. No. 696,486
Claims priority, application France, Feb. 3, 1984, 84 01881
Int. Cl.[4] G11B *5/60*
U.S. Cl. 360—103 **3 Claims**



1. A device for reading and writing on a magnetic recording support, comprising:

a monocrystalline silicon wafer having 100 and 111 crystal planes, said wafer having a bottom face parallel to 100 crystal planes and an upper face parallel to said bottom face, said wafer having its bottom face etched to comprise two sliders forming a catamaran-type profile, each slider having a bottom surface corresponding to said 100 crystal planes and two sides inclined in accordance with said 111 crystal planes,

a magnetic read and write head being arranged on said bottom surface of each slider at one end thereof, each head having a coil in a plane parallel to said bottom surface and having at least one read and write pole,

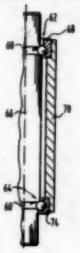
pyramidal holes having walls parallel to 111 crystal planes, said holes completely traversing said silicon wafer from said upper face down to said bottom face, said walls being covered with a first metal coating, a second metal coating being deposited on said bottom face in contact with said first metal coating and with said coil to provide for electrical connections along said metal coatings between said coils and an external circuit.

4,698,709

CARRIER ARRANGEMENT FOR MAGNETIC HEADS OF MAGNETIC DISK DRIVE ASSEMBLY

Rainer Ihlenburg; Guenter Baitz, both of Berlin, and Heinz Nixdorf, Paderborn, all of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Continuation of Ser. No. 714,954, Mar. 22, 1985, abandoned.
This application Feb. 10, 1987, Ser. No. 14,187
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1984, 3412231
Int. Cl.[4] G11B 5/48
U.S. Cl. 360—104 2 Claims



1. Apparatus for supporting a stack of magnetic head support arms (10) for rotation about a common axis, comprising:

a spindle shaft (66) having first and second axially spaced, circumferentially extending inner bearing races (60) defined in the outer circumferential surface thereof;

a bearing sleeve (70) surrounding said spindle shaft (66) and upon which said magnetic head support arms (10) are mounted;

first and second axially spaced outer races (68, 74) mounted within said bearing sleeve (70) and respectively including first and second circumferentially extending outer bearing race surfaces;

a first bearing (62) captured between said first inner race (60) and said first outer race (68); and

a second bearing (64) captured between said second inner race (60) and said second outer race (74),

said outer races (68,74) and said bearings (62,64) rotatably mounting said bearing sleeve (70) directly onto said spindle shaft (66) with said bearings (62, 64) bearing directly on said spindle shaft (66) via said inner races (60) with said spindle shaft (70) guiding the rotation of said bearing sleeve (66) and said mounted magnetic head support arms (10) about said common axis.

4,698,710

STEPPING MOTOR FOR A BELT DRIVE HEAD TRAVELLING MECHANISM FOR A FLOPPY DISK DRIVE

Kunio Suganuma, Tokyo, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jul. 26, 1985, Ser. No. 759,605
Claims priority, application Japan, Jul. 30, 1984, 59-160082
Int. Cl.[4] G11B 5/55, 21/08
U.S. Cl. 360—106 1 Claim

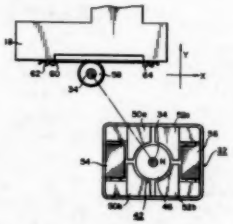
1. A magnetic head travelling device for a floppy disk drive characterized in that:

magnetic heads of said floppy disk drive are mounted on a carriage which is driven by a belt in a predetermined direction and said belt is driven by a shaft of a stepping motor;

a pair of stator coils are provided in said stepping motor and arranged in opposed end sides, relative to said predetermined direction, of a casing of said stepping motor respectively;

said stator coils are provided such that the plane of the coil winding is substantially in parallel with the direction of movement of said magnetic heads; and

exciting current is supplied to said stator coils with predetermined phases and said motor shaft of said stepping motor



is rotated by said exciting current such that inclination swinging motion of said motor shaft is a sideways motion relative to said belt;

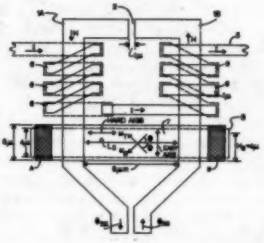
whereby travelling error of said magnetic heads is reduced.

4,698,711

SIMPLIFIED, SHIELDED TWIN-TRACK READ/WRITE HEAD STRUCTURE

Albert W. Vinal, Cary, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 2, 1985, Ser. No. 782,661
Int. Cl.[4] G11B 5/147
U.S. Cl. 360—113 6 Claims



1. An improved twin-track magnetic read/write head comprising a magnetically permeable member having two separate legs, each said leg having two ends, and said head also having a connecting portion comprising a magnetic flux sensor for sensing magnetic flux coupled from a recording medium by said legs and flux sensor joining said two legs; and

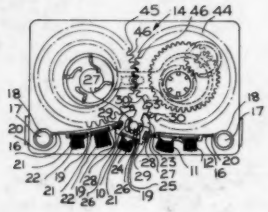
an electromagnetic coil wrapped about a section of said magnetically permeable member and wherein;

first ends of each of said two legs are arranged to vertically confront a planar magnetic medium and are configured such that imaginary vertical projections of said first ends of said legs' upon the plane of the magnetic medium produce, upon relative motion between the medium and the legs in a horizontal plane, separate parallel tracks in said medium, each said imaginary vertical projection having a maximum dimension which is aligned along a line which is generally normal to the direction of motion, whereby magnetic flux patterns may be recorded in said medium in two separate tracks by applying electrical current to said electromagnetic coil and magnetic flux patterns in said separate tracks may be read by coupling flux from said medium through the ends of said legs and therefrom through said connecting portion comprising said magnetic sensor.

4,698,712
CLEANING DEVICE

Joseph F. Fritsch, Dublin, Ireland, assignor to Roxanne Yvonne Fritsch, Dublin, Ireland

Filed Feb. 24, 1986, Ser. No. 832,202
Claims priority, application Ireland, Feb. 25, 1985, 461/85
Int. Cl.[4] G11B *5/41*
U.S. Cl. 360—128 **18 Claims**



1. A cleaning device for cleaning certain elements in the tape path of a cassette player/recorder, the cassette player/-recorder having a cassette receiving area and a take-up and feed spindle in the cassette receiving area for engaging the tape spools of a cassette tape, the cleaning device comprising:

a housing for engaging in the cassette receiving area, the housing having a front face which, in use, is adjacent the elements to be cleaned, and at least a portion of the front face being open,

a main cleaning means mounted in the housing adjacent the open portion thereof for cleaning a sound head of the cassette player/recorder,

a secondary cleaning means movably mounted in the housing adjacent the open portion thereof for cleaning another element in the tape path of the cassette player/recorder, the secondary cleaning means comprising;

a secondary cleaning member, and

an elongated carrier member extending across a portion of the open portion of the front face, the carrier member having a first end and a second end and being pivotally mounted in the housing about a fixed pivot axis, and the secondary cleaning member being mounted on the carrier member at a position longitudinally spaced apart from the pivot axis so that as the carrier member pivots about the pivot axis the cleaning member moves towards and away from the open portion of the front face, and

drive transmission means for transmitting a driving force from the take-up spindle to the carrier member for pivotal movement thereof, the drive transmission means being engagable with the carrier member, and engagable in use with the take-up spindle in the cassette receiving area.

18. A cleaning device for cleaning certain elements in the tape path of a cassette tape/recorder, the cassette player/-recorder having a cassette receiving area and a take-up and a feed spindle in the cassette receiving area for engaging the tape spools of a cassette tape, the cleaning device comprising;

a housing for engaging in the cassette receiving area, the housing having a front face which, in use, is adjacent the elements to be cleaned, and at least a portion of the front face being open,

a main cleaning means mounted in the housing adjacent the open portion thereof for cleaning the sound head in the cassette player/recorder, the main cleaning means being mounted for oscillation so that the cleaning means wipes backwards and forwards across the sound head,

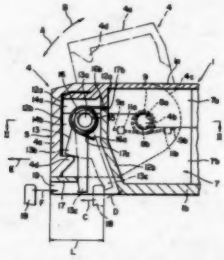
a secondary cleaning means mounted in the housing adjacent the open portion thereof for cleaning another element in the tape path of the cassette player/recorder, the secondary cleaning means being movable toward and away from the open portion of the housing, and

drive transmission means for driving the main and secondary cleaning means, the drive transmission means comprising means for driving each said cleaning means with intermittent movement to cause each said cleaning means to pause between each movement, said drive transmission means being periodically disengaged from said cleaning means so as to effect said pauses.

4,698,713
TAPE CASSETTE WITH LID LOCKING AND RELEASING MECHANISM

Hideaki Kawada, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 23, 1985, Ser. No. 757,878
Claims priority, application Japan, Jul. 23, 1984, 59-111224[U]
Int. Cl.[4] G11B *23/02*
U.S. Cl. 360—132 **6 Claims**



1. A tape cassette for use with a cassette holder having a releasing element and comprising a tape, a casing for enclosing said tape therein and having a base and an opening for drawing out said tape cassette, a lid consisting of a front plate and a pair of side plates projecting from said front plate and rotatably supported on said casing at said side plates so as to cover said opening and a lock lever arranged within said casing so as to be rotatably supported and located between said front plate and the axis of rotation of said lid, said lock lever having a lower end extending downwardly relative to said base from the axis of rotation of said lock lever for engagement with said releasing element for releasing said lid from a closed state, the axis of rotation of said lock lever being parallel to the axis of rotation of said lid, with the two axes of rotation being at least at the same height from said bottom wall of said casing, said lid having an uneven portion formed on the inside of said front plate of said lid, and said lock lever having a projection to be engaged with said uneven portion on said lid for locking said lid in a closed state.

4,698,714
FLEXIBLE MAGNETIC DISC CASSETTE

Kokichi Sugawara, Miyagiken, and Takayoshi Matsuzaka, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1985, Ser. No. 727,375
Claims priority, application Japan, Apr. 28, 1984, 59-87183; May 22, 1984, 59-74592[U]
Int. Cl.[4] G11B *23/033, 5/016, 3/70*; B65D *85/30*
U.S. Cl. 360—133 **3 Claims**

1. A magnetic disc cassette comprising:

a magnetic disc;

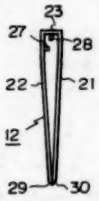
a casing for enclosing said magnetic disc therein and including a head access opening; and

a shutter provided on said casing and slidably moveable between an operating position at which it exposes said head access opening and a non-operating position at which it covers said head access opening;

said shutter including substantially rectangular upper and lower plates and a side plate which joins said upper and

lower plates along respective first edges thereof with a predetermined spacing therebetween so that said shutter has a generally U-shaped cross section within which said casing is fittingly received;

at least one of said upper and lower plates having a shutter opening through which said head access opening is exposed for insertion of a head when said shutter is in said operating position;



said upper plate, said lower plate and said side plate of said shutter being integrally molded from a synthetic resin material so as to have said U-shaped cross section; and

both said upper and lower plates having second edges opposed to the respective first edges which closely approach each other and are separated by less than said predetermined spacing when said shutter is removed from said casing, whereby said first edges of said upper and lower plates are biased toward said casing when said shutter is fitted onto said casing.

4,698,715

MAGNETIC RECORDING DISK HAVING CENTER CORE SECURED BY A BASE-LESS DOUBLE-SIDED ADHESIVE TAPE

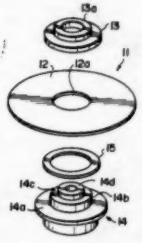
Kengo Oishi, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Japan

Filed Nov. 7, 1984, Ser. No. 669,458

Claims priority, application Japan, Nov. 16, 1983, 58-177351[U]

Int. Cl.[4] G11B *23/03, 5/82*

U.S. Cl. 360—133 **2 Claims**



1. A magnetic recording disk assembly comprising a magnetic recording disk adapted for rotation in a casing, a center core disposed near the center of the recording disk, the core comprising a first half and a second half secured together and sandwiching therebetween the magnetic recording disk, the second half being secured to the magnetic recording disk by means of a base-less double-sided adhesive tape sandwiched between the recording disk and the second half of the center core.

4,698,716

SUPPORT FOR MAGNETIC RECORDING DISK AND ITS PRODUCTION PROCESS

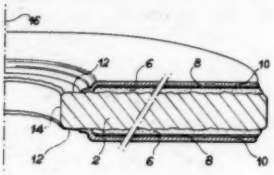
Jean-Pierre Lazzari, Coremc, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 30, 1985, Ser. No. 696,515

Claims priority, application France, Feb. 3, 1984, 84 01883

Int. Cl.[4] G11B *5/82, 5/70*

U.S. Cl. 360—135 **4 Claims**



1. A support for a magnetic recording disk comprising:

a metal disk covered by an organic coating;

a thin, hard coating on said organic coating wherein said thin, hard coating is a material comprising hydrous silicate or silica.

4,698,717

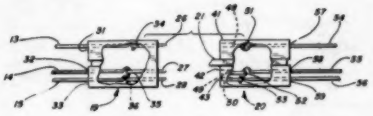
ELECTRICAL SAFETY DROP DISCONNECT

William J. Scheid, 3728 W. 215th St., Unit 203, Matteson, Ill. 60443

Filed Jul. 2, 1985, Ser. No. 751,311

Int. Cl.[4] H02H *7/26*

U.S. Cl. 361—1 **23 Claims**



1. An electrical separating device comprising:

(A) a first member having:

(1) a first electrically nonconductive housing with first opening means:

(2) a first elongated connector, coupled to said housing, composed of an electrically conductive substance extending from inside said first housing through said first opening means in said housing and projecting outside of said housing; and

(3) first adjoining means, coupled to said first connector and located inside of said first housing, for connecting said first connector to an electrical wire;

(B) a second member having:

(1) a second substantially electrically nonconductive housing with second opening means into which said first connector may enter;

(2) a second connector, coupled to said second housing, composed of an electrically conductive substance and positioned within said second housing, to make contact with said first connector entered into said second opening means, establishing an electrical connection between said first and second connectors; and

(3) second adjoining means, coupled to said second connector and located inside of said second housing, for connecting said second connector to an electrical wire; and

(C) coupling means, separate from and in contact with said first and second members, for, in addition to friction between said first and second members, holding said first and second members together but, upon a nonmanual disen-

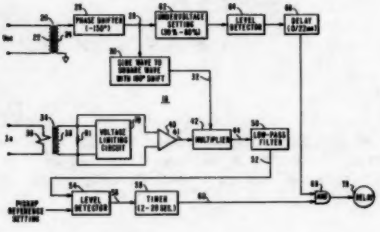
gagement of said coupling means from between said first and second members, pemitting said said first and second members to separate from each other upon the exertion of a predetermined force pulling said first and second connectors apart from each other.

4,698,718

ELECTRONIC REVERSE POWER RELAY

Kung C. Chow, and Shan C. Sun, both of Coral Springs, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 26, 1985, Ser. No. 802,131
Int. Cl.[4] F02H *3/38*
U.S. Cl. 361—77 **10 Claims**



1. An electronic protective relay for detecting a reverse power condition of a three-phase alternating current (ac) generator for the protection against generator motoring, said electronic relay comprising:

first circuit for receiving a signal representative of the current in one of said phases of said ac generator and for generating a current signal representing said received signal;

second circuit for receiving a signal representative of a voltage at the output of said ac generator and for generating a voltage signal representing said received signal, said voltage signal having a phase relationship with said current signal;

third circuit for phase shifting said voltage signal generated by said second circuit a first predetermined phase angle to effect a first signal representative of said phase shifted voltage signal;

fourth circuit for multiplying said current signal generated by said first circuit with said first signal to generate a second signal having a component representative of the real power of said ac generator;

fifth circuit for separating said real power component from the remainder of said first signal; and

sixth circuit for detecting a reverse power condition from said separated signal component and generating a signal indicative of said reverse power condition.

4,698,719

PROTECTIVE TRIGGERING OF THYRISTORS IN A PULSE GENERATOR

Claus E. Taarning, Ballerup, Denmark, assignor to F. L. Smidth & Co. A/S, Copenhagen, Denmark

Filed Aug. 15, 1986, Ser. No. 897,293
Claims priority, application Denmark, Aug. 19, 1985, 3747/85
Int. Cl.[4] H02H *3/093*
U.S. Cl. 361—87 **2 Claims**

1. A triggering circuit which protects a thyristor switch element of a pulse generator, said pulse generator having a pulse circuit, said protective triggering circuit comprising:

a high frequency current transformer, said current transformer having a primary winding and a secondary winding, said primary winding being series-coupled with said pulse circuit of said pulse generator;

a resistance coupled in parallel across said secondary winding thereby to provide a current-representing voltage signal thereacross in use;

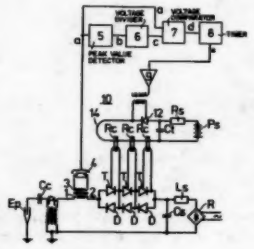
a peak value measuring unit which measures said current-representing voltage peak value;

a voltage divider connected to said peak-value measuring unit for providing a signal proportional to said peak-value signal;

a voltage comparator connected to said resistance and said voltage divider which compares said current representing voltage with said peak-value proportional signal, said comparator having an output to indicate whether or not said peak-value proportional signal exceeds said current representing voltage; and,

a timer circuit connected to said comparator and having an output trigger signal activated by said voltage comparator output signal indicating said peak-value proportional signal exceeding said current representing voltage; and,

an amplifier connected to said timer circuit to provide an output trigger current.

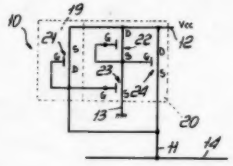


4,698,720

DYNAMIC PROTECTION INTEGRATED DEVICE, IN PARTICULAR FOR MOS INPUT STAGES INTEGRATED CIRCUITS

Roberto Finaurini, Ancona, Italy, assignor to SGS Microelettronica S.p.A., Catania, Italy

Filed May 12, 1986, Ser. No. 862,321
Claims priority, application Italy, May 13, 1985, 20670 A/85
Int. Cl.[4] H02H *3/24*
U.S. Cl. 361—91 **5 Claims**



1. A dynamic protection device, in particular for protecting integrated circuits having a MOS technology input stage against electrostatic discharges, comprising first and second reference potential lines; a connection line for connection to an integrated circuit to be protected; a first protection section including first switching means having a first input terminal and a first output terminal and defining a first unidirectional line for conducting current from said first input terminal to said first output terminal when the voltage drop from said first input terminal to said first output terminal of said first switching means exceeds a preset value defining a device upper threshold voltage value; a second protection section including second switching means having a second input terminal, a second output terminal and a further reference terminal and

defining a second unidirectional line for conducting current from said second input terminal to said second output terminal when the voltage drop from said further reference terminal to said second output terminal exceeds a further preset value defining a device lower threshold voltage value, said first input terminal of said first switching means and said second output terminal of said second switching means being connected together and to said connection line, said first output terminal of said first switching means and said second input terminal of said second switching means being connected together and to said first reference potential line, and said further reference terminal being connected to said second reference potential line, thereby said first switching means turning on when the voltage drop from said connection line to said first reference potential line exceeds said device upper threshold voltage value and pulling a current from said connection line toward said first reference potential line and said second switching means turning on when the voltage drop from said second reference potential line to said connection line exceeds said device lower threshold voltage value and pulling a current from said first reference potential line toward said connection line.

4,698,721

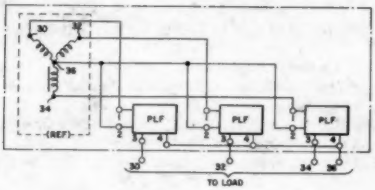
POWER LINE FILTER FOR TRANSIENT AND CONTINUOUS NOISE SUPPRESSION

George H. Warren, Newport News, Va., assignor to Puroflow Corp., Santa Monica, Calif.

Continuation of Ser. No. 549,436, Nov. 7, 1983, abandoned. This application Aug. 1, 1986, Ser. No. 892,895

Int. Cl.[4] H02H *1/04*

U.S. Cl. 361—110 **25 Claims**



1. A power line filter having first and second line terminals providing a line voltage and first and second load terminals, said filter receiving a transient over first through fourth time periods and receiving long-term broad spectrum continuous interference, and comprising:

transient suppression means, connected between said first and second line terminals, for shunting the transient and clamping the line voltage, said transient suppression means comprising:

first clamping means, connected between the first and second line terminals, for shunting a part of the energy of the transient and clamping the line voltage during the second and third time periods, said first clamping means comprising a selenium surge suppressor having an energy dissipation capability of at least 800 joules;

second clamping means, connected between the first and second line terminals, for shunting a part of the energy of the transient and clamping the line voltage in conjunction with said first clamping means during the third time period; and

shunt means, connected between the first and second line terminals, for shunting part of the energy of the transient during the fourth time period and turning off said first and second clamping means at the beginning of the fourth time period; and

continuous suppression and dissipation means, connected between said first and second line terminals and said first and second load terminals, for dissipating the continuous interference and storing part of the energy of the transient during the first through third time periods, said continuous suppression means including: energy storage means for storing a part of the energy of the transient during the first through third time periods and for transferring the stored energy to said transient suppression means during the second through fourth time periods; and energy dissipation means for dissipating another part of the energy of the transient during the first through fourth time periods, said transient suppression means shunting the stored energy during the second through the fourth time periods.

4,698,722

TRANSIENT PROTECTION UNIT

Karl L. E. Kron, Järfälla, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

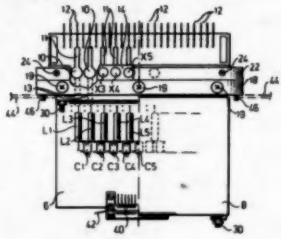
PCT No. PCT/SE85/00040, § 371 Date Oct. 3, 1985, § 102(e) Date Oct. 3, 1985, PCT Pub. No. WO85/03602, PCT Pub. Date Aug. 15, 1985

PCT Filed Jan. 29, 1985, Ser. No. 786,953

Claims priority, application Sweden, Feb. 3, 1984, 8400555

Int. Cl.[4] H02H *3/22*

U.S. Cl. 361—111 **2 Claims**



1. Transient protection apparatus connected to signal conductors to protect equipment connected to said conductors, said apparatus comprising primary protection components in the form of gas discharge tubes (X1–20) extending between said conductors and ground and secondary protection components connected to the primary protection components and being in the form of filter components (L1–20, C1–20), the apparatus including a cabinet comprising a wall, a circuit board having a contact surface, a conducting bar connected with said wall, the components being mounted on said circuit board (2,4,6), said circuit board extending through the wall (44) of said cabinet, the primary protection components being located outside of the cabinet, the secondary protection components being located inside of the cabinet, the gas discharge tubes including electrodes and being clamped with said electrodes between said contact surface (10) of the board and said conducting bar (16,18) which is connected with said wall (44), and further conductors (13) between the primary and the secondary protection components, said further conductors extending in screened relationship inside of said circuit board through said wall to connect said primary and secondary protection components.

4,698,723

LIGHTNING DISCHARGE PROTECTION ROD

Charles F. Bryan, Jr., Poquoson, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 24, 1986, Ser. No. 855,983

Int. Cl.[4] H05F *3/00*

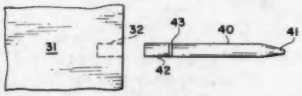
U.S. Cl. 361—218 **7 Claims**

1. A lightning protection system for in-atmosphere vehicles having an aerodynamic surface thereon comprising:

at least one electrically conductive member affixed to and extending rearward from the trailing edge of said aerodynamic surface of the vehicle.

said electrically conductive member being in the form of a rod constructed of a material having a conductivity slightly greater than said aerodynamic surfaces;

said rod having a uniform diameter along a major portion of the length thereof, a tapered tip at the aft end, and being



affixed to said aerodynamic surface such that an electrically contact surface between the rod and the surface extends for approximately three rod diameters; and

means for securing said rod to said aerodynamic surface;

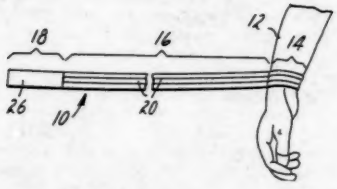
whereby a sacrificial lightning protection system is formed wherein said rod will provide a preferred conductive path and will dissipate the restrike energy through atomization of said rod.

4,698,724

DISPOSABLE, ELECTRICALLY CONDUCTIVE BODY GROUNDING STRAP

Richard W. Burvee, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 18, 1986, Ser. No. 944,256
Int. Cl.[4] H05F 3/02
U.S. Cl. 361—220 **29 Claims**



1. An electrically conductive strap having a distal end adapted to be secured to an object and having a proximate end adapted to be coupled to electrical ground, comprising:

an elongate strip of electrically conductive material, said material being flexible in at least one dimension, said material having an object contacting portion at said distal end and having a lead portion between said distal end and said proximate end and having a ground contacting portion at said proximate end;

securing means affixed to said object contacting portion of said material for being able to adhesively secure said material to said object, with said material in electrical contact with said object; and

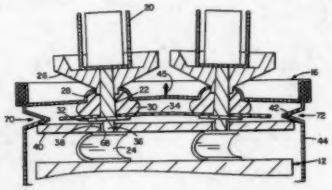
ground contacting means at said ground contacting portion of said material for being able to be coupled to electrical ground.

4,698,725

PRESSURE SENSITIVE INTERRUPTERS FOR CAPACITORS

Frederick W. MacDougall, Marion, and Thomas A. Murphy, New Bedford, both of Mass., assignors to Aerovox Incorporated, New Bedford, Mass.

Filed Mar. 21, 1986, Ser. No. 842,642
Int. Cl.[4] H01G 1/11, 1/06
U.S. Cl. 361—272 **23 Claims**



3. A capacitor comprising

a capacitive element,

a hollow body containing said element,

electrical terminals mounted on said body and each connected by a conductor via a predefined pathway to said element,

means for disconnecting said electrical terminals from said element upon failure of said capacitor, and

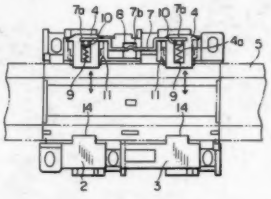
solid means for blocking said pathway to prevent reconnection of said conductor following disconnection.

4,698,726

STRUCTURE FOR ATTACHING A SWITCHGEAR TO A RAIL

Shigeharu Ootsuka, Kagamihara, and Yuji Mizuno, Nagoya, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 799,493, Nov. 19, 1985, abandoned.
This application Feb. 19, 1987, Ser. No. 16,987
Claims priority, application Japan, Nov. 19, 1984, 59-174318
Int. Cl.[4] H02B 1/04
U.S. Cl. 361—335 **8 Claims**



1. A structure which mounts an assembly of electrical devices mechanically joined with each other to a rail, the structure comprising:

a movable hook on each of said devices detachably and resiliently engaging said rail, each of said hooks having a hole therein; and

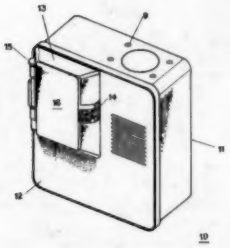
an operating member having opposite ends and a central portion located between said opposite ends, each of said opposite ends inserted into the hole of eah movable hook and being accessible from the exterior of said assembly for moving said hooks simultaneously to enable said assembly to be attached to or detached from said rail, said central portion being bent into a U-shape which has a through portion bent toward said rail and a recessed portion open toward said rail for receiving therein a tool for operating said movable hooks.

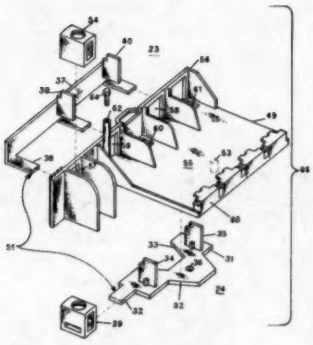
4,698,727

COMPACT NON-METALLIC LOAD CENTER ENCLOSURE

David A. Hibbert, Tolland, and Larry J. Newmark, Avon, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Sep. 15, 1986, Ser. No. 907,250
Int. Cl.[4] H02B 1/04
U.S. Cl. 361—356 10 Claims





1. A molded plastic load center comprising:

a plastic cover removably attached to a plastic case;

a plastic circuit breaker support comprising a slotted planar bottom support and an apertured upright back support; and

an orthogonal branch strap assembly comprising;

a first circuit breaker branch strap supported by said bottom support and having a plurality of first circuit breaker stab connectors extending perpendicular from said first branch strap through said slotted bottom support;

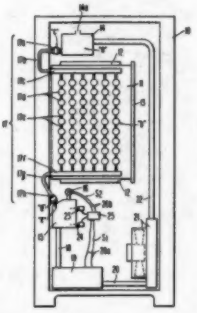
a second circuit breaker branch strap supported by said back support and having a plurality of second circuit breaker stab connectors extending perpendicular from said second branch strap through said apertured back support, said second circuit breaker stab connectors being interposed with said first circuit breaker stab connectors.

4,698,728

LEAK TOLERANT LIQUID COOLING SYSTEM

Jerry I. Tustaniwskyj, Mission Viejo, and Kyle G. Halkola, San Diego, both of Calif., assignors to Unisys Corporation, Detroit, Mich.

Filed Oct. 14, 1986, Ser. No. 918,057
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—385 8 Claims



1. A leak tolerant cooling system, which cools electrical components with a liquid, comprising:

a frame holding a plurality of said electrical components;

a top reservoir, mounted on said frame above said components, holding said liquid;

a conduit means, coupled to said top reservoir and said components, conveying said liquid in a downward direction from said top reservoir over said components;

a bottom reservoir, coupled to said conduit means below said components, receiving said liquid from said conduit means as well as any air which happens to leak into said conduit means; and

a control means, coupled to said bottom reservoir; said control means including: (a) a pump which sucks said liquid and said air through said conduit means at subatmospheric pressures and into said bottom reservoir in response to a control signal; (b) a means for generating said control signal beginning when said liquid in said bottom reservoir is at a predetermined high level and continuing until a certain amount of said liquid in said bottom reservoir is displaced with said air and reaches a predetermined low level; and (c) a valve positioned on said bottom reservoir above the liquid therein which opens when said pump is stopped and allows said air to be pushed out of said bottom reservoir by said liquid as it flows from said top reservoir through said conduit means and into said bottom reservoir due to gravity.

4,698,729

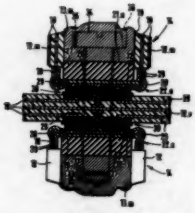
ARRANGEMENT OF COMPONENTS

Gerhard Riesner, Nuremberg, and Walther Koch, Schwalbach, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Apr. 23, 1986, Ser. No. 855,970
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1985, 3536963
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—386 10 Claims

1. In a compact arrangement of structural components including interconnected conductor plates with electrical components and with cooling plates being large-surfaced flat plates constituting carriers for conductor plate modules arranged on at least one of the side surfaces thereof; and having one end surface with contacting areas of flexible strip conductors pressing against contacting conductor paths on a wired conductor plate oriented perpendicularly thereto, said cooling plates for

the dissipation of heat losses generated by the electrical components, particularly in the formation of a complex signal processing circuit in flying bodies or projectiles; the improvement comprising in that along said contacting end surfaces, contacting areas of said flexible strip conductors to the conductor plate modules are pressed by clamping screws engaging through the contact end face into the plane of the wired conductor plate, and said clamping screws engage in the same plane of the conductor plate on the module located opposite that side of the wired conductor plate.

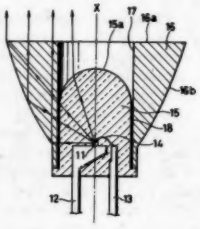


4,698,730

LIGHT-EMITTING DIODE

Hirou Sakai, Atsugi, and Toshihide Kawamura, Yono, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Aug. 1, 1986, Ser. No. 892,503
Int. Cl.[4] F21V *3/00*
U.S. Cl. 362—311 **35 Claims**



1. A light-emitting diode, comprising:

a light-emitting element;

means for coupling said light-emitting element to a source of electrical power;

a resin lens portion molded around said light-emitting element and including means for directing light emitted by said light-emitting element toward an illumination output portion of said light-emitting diode; and

cap means made of a light-transparent resin and having side walls defining a hollow portion substantially at the center of said cap means and extending away from the illumination output portion of said light emitting diode, said side walls having an outer peripheral surface, said cap means being coupled to said lens portion of said light-emitting diode with said lens portion being arranged in said hollow portion;

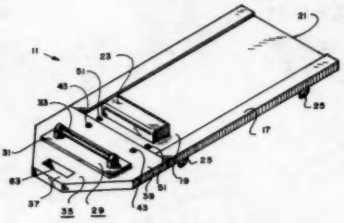
said outer peripheral surface of said cap means walls being formed into approximately a parabolic surface and including means to reflect side-directed light emitted from said light-emitting element toward said illumination output portion of said light-emitting diode.

4,698,731

MECHANIC'S CREEPER

Frederick W. Johns, Sr., Rt. 2, Box 220, Hardy, Ark. 72542

Continuation-in-part of Ser. No. 662,497, Feb. 19, 1985, abandoned. This application Sep. 30, 1985, Ser. No. 781,700
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 362—61 **8 Claims**



1. A creeper of the type including a body member having a forward end and a rearward end and including a plurality of rollers attached to said body member for rollably supporting a person with respect to a target area, wherein the improvement comprises:

(a) light means for selectively illuminating said target area; and

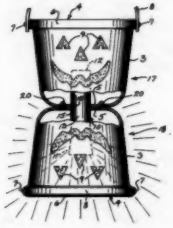
(b) attachment means fixedly secured to said body member adjacent said forward end thereof for receiving said light means and for attaching said light means relative to said body member adjacent said forward end thereof, said attachment means being substantially planar and having a cavity therein for holding said light means.

4,698,732

CARRIER FOR TRICK-OR-TREATING OR THE LIKE

Charles P. Hickey, 1904-27 St., Monroe, Wis. 53566

Filed Nov. 12, 1985, Ser. No. 796,964
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—154 **12 Claims**



1. A carrier for use wherein a number of items are to be accumulated and carried in darkness, said carrier comprising, in combination:

(a) a unitary carryable bucket-like container (**2, 17** or **18**) having an open top (**4**), a side wall (**3**) and a bottom wall (**5**),

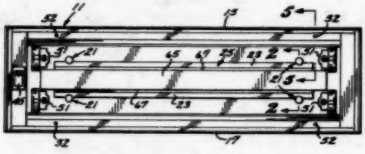
(b) an opening (**15**) disposed in and of reduced diameter relative to said bottom wall (**5**),

(c) and light source means (**10, 13, 11**) for preventing items accumulated in said container through said open top from falling through said opening.

4,698,733

CLIP ON STAND OFF WIREWAY COVER

Alan R. Griffin, Thousand Oaks, Calif., assignor to Thin-Lite Corporation, Camarillo, Calif.

Filed Nov. 5, 1986, Ser. No. 927,100
Int. Cl.[4] F21S 3/00
U.S. Cl. 362—222 2 Claims

1. A fluorescent tube lighting fixture comprising:

an elongated, relatively thick extruded channel shaped housing formed with a back wall defining a planar mounting plate having a flat front side including a longitudinal central area defining a raceway, said housing further including coextensive oppositely disposed side walls projecting from the opposite sides of said flat front side of said back wall and formed at their free ends with inwardly opening confronting slots, said housing being further formed with mounting holes for receipt of mounting screws to mount said housing directly from a support surface;

fluorescent tube sockets mounted in alignment with one another directly on said back wall at the opposite ends of said housing for receipt therein of the opposite ends of fluorescent light tubes;

electrical components mounted in said raceway;

through bores formed on the lateral opposite sides of said raceway intermediate said raceway and said sidewalls;

shoulder rivets formed centrally with respective stems projecting through said bores and further formed on the front sides with enlarged in diameter shanks defining respective rearwardly facing annular surfaces and projecting from the front side of said back plate and terminating in respective rivet heads defining rearwardly facing shoulders spaced a predetermined distance from said front wall, said stems being rolled over on the back side of said back wall to cooperate with said respective annular surfaces to sandwich the thickness of said back wall therebetween;

an elongated relatively thin way cover for covering said electrical components formed in cross section with a hat shape to define a front wall and oppositely disposed side walls projecting rearwardly therefrom and turned outwardly away from one another at their free extremities to form respective flanges having a thickness less than said predetermined distance;

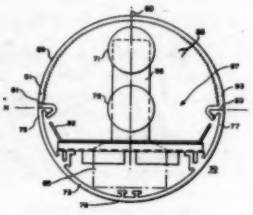
said way cover being so configured as to fit over said electrical components with said flanges received between the said shoulders of the respective rivets and front of said back wall, said side walls being flexible and resilient to normally hold said flanges spaced apart with sufficient force to maintain them engaged under said shoulders while permitting said side walls to be manually flexed inwardly a sufficient distance to carry said flanges inwardly toward one another a distance sufficient to clear said rivet heads whereby mounting screws may be inserted through said mounting holes to mount said housing directly from a mounting surface and said way cover may be mounted and dismounted from said housing by manually flexing said free ends of such way cover side walls inwardly to clear the respective shoulders.

4,698,734

LENSED INDIRECT LUMINAIRE WITH SIDE ANGLE BRIGHTNESS CONTROL

Peter Y. Y. Ngai, Danville, Calif., assignor to Peerless Lighting Corporation, Berkeley, Calif.

Filed Jun. 1, 1984, Ser. No. 616,076
Int. Cl.[4] F21V 5/02
U.S. Cl. 362—225 25 Claims



6. An indirect luminaire comprising

an opaque housing, said housing having a bottom portion and at least one side wall extending upwardly from said bottom portion to form a top edge extending substantially in a horizontal plane, said horizontal plane defining a horizontal plane of said luminaire,

a source of light, and

a lens having a lens base, said lens extending upwardly from the top edge of said housing so as to form a lens cavity above the horizontal plane of said luminaire, and

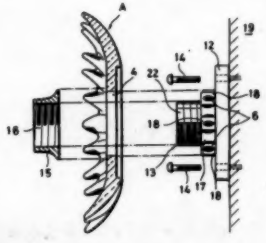
said lens including a light refracting prismatic surface extending upwardly from said lens base, substantially the entirety of said prismatic surface on said lens between said lens base and proximate the top of said lens cavity being formed to refract light incident thereon in a generally more upward direction and further being formed such that, for substantially all horizontal plane angles, light with horizontal plane side angles of incidence to said prismatic surface are refracted generally in a more upwardly direction than light incident from a perpendicular horizontal angle of incidence.

4,698,735

DECORATOR LAMP

Akira Hirono, Kyoto, Japan, assignor to Kuroi Glass Industry Co., Ltd., Kyoto, Japan

Division of Ser. No. 679,059, Dec. 6, 1984, abandoned. This application Feb. 26, 1986, Ser. No. 833,140
Claims priority, application Japan, Apr. 12, 1984, 59-52710; Jun. 25, 1984, 59-93772
Int. Cl.[4] F21V 5/00
U.S. Cl. 362—230 9 Claims



1. A decorator lamp comprising:

(A) a glass body having a surface concave toward the center

of the surface and defining a through-hole formed centrally through the glass body in such a manner that the outer dense layer is removed at the desired position;

(B) a light source provided in the through-hole and composed of a central bulb and a plurality of miniature bulbs arranged in such a way that the miniature bulbs are located within the through-hole and, when seen in plan view of the decorator lamp, the miniature bulbs surround the central bulb, said miniature bulbs being arranged in a plane closer to the concave surface of the glass body than the central bulb;

(C) a miniature bulb installation member fit in the through-hole and holding the miniature bulbs therein, said miniature bulb installation member defining recesses at a constant angular interval in the peripheral side wall thereof, the miniature bulbs being received in said recesses;

(D) a mounting base arranged on the side of another surface of the glass body, said other surface being opposite to the concave surface;

(E) an externally-threaded bayonet base provided on the miniature bulb installation member and extending in a direction away from the concave surface; and

(F) an internally-threaded holder cap fit over the bayonet base and having, at one end thereof which is closer to the concave surface, an outer diameter larger than the diameter of the through-hole so that the glass body is held in place between the holder cap and the mounting base.

7. A decorator lamp comprising a glass body having a surface concave toward the center of the surface and defining a through-hole formed at a desired position of the glass body in such a manner that the outer dense layer is removed at the desired position, a light source provided in the through-hole and composed of a central bulb and a plurality of miniature bulbs arranged in such a way that the miniature bulbs are located within the through-hole and, when seen in plan view of the decorator lamp, the miniature bulbs surround the central bulb, said glass body having a rear surface opposite to the concave surface, said rear surface being at least partly frosted.

4,698,736

PROTECTION CIRCUIT FOR A POWER CONVERTER APPARATUS

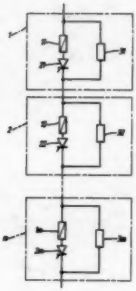
Osamu Higa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Dec. 16, 1986, Ser. No. 942,399

Claims priority, application Japan, Dec. 16, 1985, 60-282409; Dec. 16, 1985, 60-282410

Int. Cl.[4] H02H *7/00*

U.S. Cl. 363—51 **11 Claims**



1. A protection circuit for a power converter apparatus including at least one unit circuit, said at least one unit circuit comprising:

at least one fuse connected in series with at least one semiconductor element; and

a non-linear resistor connected in parallel at least with said fuse.

4,698,737

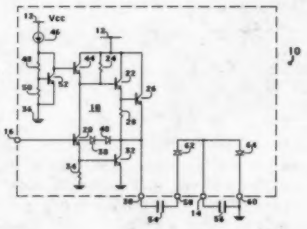
DC TO DC CONVERTER

Ira Miller, Tempe, and John E. Hanna, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 2, 1987, Ser. No. 9

Int. Cl.[4] H02M *7/797*

U.S. Cl. 363—63 **8 Claims**



1. A circuit for establishing a predetermined and regulated negative direct current (DC) voltage at an output, comprising:

first and second power supply conductors;

a push-pull driver stage coupled between said first and second power supply conductors which is responsive to an applied clock signal for alternately sourcing and sinking current at an output thereof;

circuit means coupled to said push-pull driver stage for clamping the voltage level at said output of the latter to a predetermined value;

a first charge storage device coupled between said output of said push-pull driver stage and a first terminal;

a second charge storage device coupled between second and third terminals, said second terminal being coupled to the output of the circuit and said third terminal being coupled to ground potential;

diode circuit means for alternately providing a charge circuit path for said first and second charge storage devices between said output of said push-pull driver stage and said third terminal such that charge is transferred therebetween to produce the negative voltage at the output of the circuit.

4,698,738

PARALLEL CONNECTED POWER SUPPLIES HAVING PARALLEL CONNECTED CONTROL CIRCUITS WHICH EQUALIZE OUTPUT CURRENTS TO A LOAD EVEN AFTER ONE SUPPLY IS TURNED OFF

John A. Miller, San Diego, and James D. Walker, Escondido, both of Calif., assignors to Unisys Corporation, Detroit, Mich.

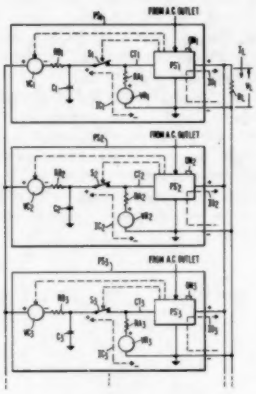
Filed Nov. 24, 1986, Ser. No. 934,025

Int. Cl.[4] H02M *7/04*

U.S. Cl. 363—65 **10 Claims**

1. A power supply, for use in parallel with other power supplies, to furnish a respective output current to an external load; said power supply including: a control circuit branch for carrying a control current, and a means for adjusting the magnitude of said output current as a function of said control current through said control circuit branch; said control circuit branch including a pair of terminals for coupling said control circuit branch in parallel to similar control circuit branches in said other power supplies; said power supply also having a means for turning the supply on and off independent of the other power supplies; and, said control circuit branch further

including a switch means for automatically inhibiting said control current through said control circuit branch when said



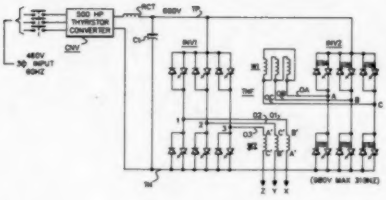
power supply is off and enabling said control current through said control circuit branch when said power supply is on.

4,698,739

12-PULSE MOTOR DRIVE

Derek A. Paice, Palm Harbor, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 7, 1986, Ser. No. 928,145
Int. Cl.[4] H02M *7/00*
U.S. Cl. 363—71 **6 Claims**



1. In a 12-pulse inverter system including a voltage source, a DC link and at least a first inverter set and second inverter set providing respective first and second three-phase outputs, the combination of:

a three-phase transformer having a primary and a secondary, said primary being connected to one of said first and second outputs for generating at said secondary a third three-phase output;

with said third three-phase output being connected in series with the other of said first and second outputs to form the output of said 12-pulse inverter system;

said three-phase transformer being rated at half the power of said third three-phase output.

4,698,740

CURRENT FED REGULATED VOLTAGE SUPPLY

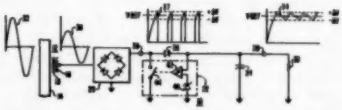
Eugene L. Rodgers, Monroeville Boro, and Eric J. Stacey, Penn Hills Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 14, 1986, Ser. No. 829,742
Int. Cl.[4] H02M *7/155*
U.S. Cl. 363—89 **14 Claims**

1. A locally isolated, regulated power supply providing a regulated dc power output from an ac system current source having a large dynamic range, comprising:

ac-to-dc converter means for providing a rectified dc output from an ac input comprising a current transformer in combination with a rectifier means;

the current transformer having a saturable magnetic stacked joint core for receiving a primary winding and a lumped secondary winding, the primary winding connected to the ac system current source with the secondary winding and magnetic core being inductively coupled thereto, the current transformer producing a reduced secondary ac output that is a nonlinear function of the ac system current characterized by the coupling between the core and the secondary winding decreasing in a nonlinear manner as the core approaches saturation thereby limiting the increase in the secondary ac output of the current transformer to a value substantially less than the increase in the ac system current when the core is in saturation;



the rectifier means connected to the secondary winding for converting the secondary ac output to the rectified dc output, the rectified dc output comprising a dc output voltage and a dc output current;

electronically controlled switch means having as inputs a predetermined reference voltage and the dc output voltage and connected across the converter means for the continual shunting of the converter means whenever the dc output voltage is equal to or greater than the predetermined reference voltage;

capacitive voltage support means connected to the output of the converter means for maintaining the dc output voltage substantially equal to the reference voltage; and

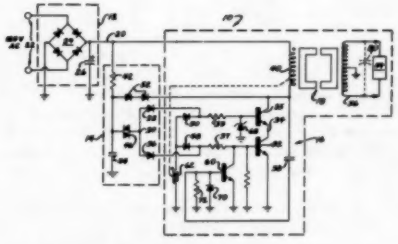
isolation means for isolating the voltage support means voltage from the converter means when shunted by the switch means thereby preventing the discharge of the voltage support means.

4,698,741

HIGH EFFICIENCY HIGH VOLTAGE POWER SUPPLY FOR GAS DISCHARGE DEVICES

David Pacholok, 437 N. Crystal, Elgin, Ill. 60120

Filed Jul. 22, 1985, Ser. No. 757,540
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—131 **1 Claim**



1. A high voltage power supply for gas discharge or similar high voltage devices comprising a solid state oscillator, the oscillator including a high voltage bipolar transistor, an output transformer having primary, secondary, and feedback windings, the primary winding operatively connected to the collector of the high voltage transistor, the primary winding having

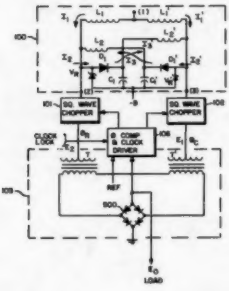
an inductance, a capacitor operatively connected to the collector of the high voltage transistor, the capacitor and primary winding inductance forming a resonant output tank of said solid state oscillator, the secondary transformer winding adapted for connection to the gas discharge or similar high voltage device; a first switching transistor operatively connected to the emitter of the high voltage transistor, said switching transistor adapted to selectively pass current from the emitter of the high voltage transistor only when the switching transistor is biased into conduction; means operatively connected to the base input of the high voltage transistor for passing current therefrom; bias means operatively connected to the high voltage and switching transistors for biasing said transistors into conduction, said bias means including the transformer feedback winding operatively interconnected to the high voltage and switching transistors to provide positive feedback bias to said transistors; means for inhibiting conduction bias current to the switching transistor, said inhibiting means including differentiating means operatively connected to the collector output of the high voltage transistor for detecting increasing voltage levels thereon whereby the switching transistor is biased into non-conduction whenever the differentiator means detects an increasing voltage level on the collector of the high voltage transistor, the output tank capacitor is operatively connected to the switching transistor whereby said output tank capacitor functions as the differentiator means of the inhibiting means.

4,698,742

HIGH-VOLTAGE MILBERGER SLIP SLIDE POWER CONDITIONER

Franklin B. Jones, Baltimore; Walter E. Milberger, Severna Park; David E. Bulgher, Ellicott City, and Charles S. Kerfoot, Pasadena, all of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 1, 1986, Ser. No. 891,821
Int. Cl.[4] H02M *7/00*
U.S. Cl. 363—124 **11 Claims**



1. A slip slide power converter comprising:

a choke feed direct current circulator which receives and splits a direct current input signal to produce therefrom first and second voltage output signals and provide thereby current limiting on said direct current input signal;

first and second second square wave choppers which are electrically connected to and which respectively receive said first and second voltage outputs signals from said choke feed direct current circulator, said first and second square wave choppers respectively producing therefrom first and second continuous wave square wave signals having phases which are out of phase with other, said first and second square wave choppers each respectively receiving a first and second phase control signal to adjust the phases of the first and second continuous wave square wave signals that they produce;

a combiner which receives and algebraically combines the first and second continuous wave square wave signals from the first and second square wave choppers, said combiner thereby producing a converted square wave output signal which represents a converted version of said direct current input signal; and

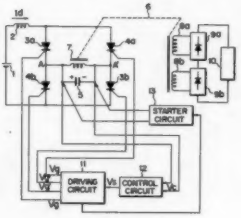
a means for producing said first and second phase control signals for said first and second square wave choppers, said producing means sampling said converted square wave output signal from said combiner for phase error and producing said first and second phase control signals to minimize said phase error, said producing means thereby reducing degradation in said converted square wave output signal.

4,698,743

RESONANCE INVERTER WITH CONTROL MEANS FOR DETECTING PEAK VOLTAGE AND HAVING A STARTING CIRCUIT

Toshihiro Onodera, Tokyo, and Youichi Masuda, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 24, 1986, Ser. No. 910,979
Claims priority, application Japan, Sep. 25, 1985, 60-211424
Int. Cl.[4] H02M *7/523, 7/517*
U.S. Cl. 363—136 **9 Claims**



1. A resonance inverter comprising:

a resonance capacitor;

an inductor connected in parallel with said resonance capacitor, to form a parallel resonant circuit;

at least two semiconductor switches provided between said resonance capacitor and said DC power source, to control the charge/discharge of said capacitor; and

control means to alternately render conductive said semiconductor switches, with a certain lead phase difference with respect to the peak point of a peak value of the voltage across said resonance capacitor;

said control means including:

reference voltage generating means for generating the peak value of the voltage across said resonance capacitor, and producing a reference voltage, which is lower than said peak value, but proportional to said peak value;

comparing means for comparing said reference voltage and said capacitor terminal voltage, and producing pulses with a predetermined lead phase difference with respect to said terminal voltage; and

switch drive means for generating trigger pulses to render said switches conductive in response to the output pulse from said comparing means.

4,698,744
INVERTER APPARATUS

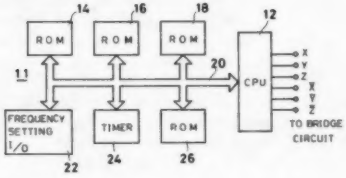
Kiyoshi Itani; Hisashi Tokizaki; Tomohide Funagoshi; Nobuo Ohtsuka; Katsuhiro Ohkubo, and Hikaru Katsuki, all of Gunma, Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Mar. 19, 1985, Ser. No. 713,479

Claims priority, application Japan, Mar. 26, 1984, 59-57779; Apr. 5, 1984, 59-68719; Jun. 5, 1984, 59-114845; Jul. 19, 1984, 59-149961; Jul. 25, 1984, 59-154961

Int. Cl.[4] G05B *19/02*; H02P *5/40*

U.S. Cl. 364—140 **12 Claims**



1. An inverter apparatus for providing a periodic output signal, comprising:

a bridge circuit having a plurality of switching elements each coupled to selectively transmit to an output thereof a first signal level when said switching element is an ON state and a second signal level when it is in an OFF state,

first memory means for storing pattern data of combinations of ON state and OFF state of said respective switching elements obtained based on the PWM theory,

time data outputting means for outputting time data corresponding to each said combination of said first memory means, said time data including ON time data defining the time during which said ON state of said respective switching elements is maintained and OFF time data defining the time during which said OFF state of said respective switching elements is maintained, and

switching signal outputting means responsive to said pattern data and said time data for outputting switching signals to said switching elements, said outputting means including means for selecting for said switching signal a sequence of said pattern data combinations calculated to define a cycle of said output signal for the inverter and means for maintaining each of said pattern data combinations for a time defined by the corresponding time data, whereby the period of the output AC signal cycle defined by said sequence of pattern data combinations can be made to correspond to different frequencies, said switching signals being applied to the respective switching elements of said bridge circuit from which an AC output is outputted, the frequency of said AC output being determined over the entire operating frequency range of the inverter by the total time data of said ON time data and said OFF time data is one cycle.

4,698,745
PROCESS CONTROL APPARATUS FOR OPTIMAL ADAPTATION TO A DISTURBANCE

Kazuo Hiroi, Hachiouji, and Kojiro Ito, Machida, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 7, 1985, Ser. No. 699,087

Claims priority, application Japan, Feb. 7, 1984, 59-19335; Jul. 9, 1984, 59-140622

Int. Cl.[4] G05B *13/02*; G06F *15/46*

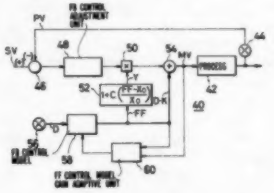
U.S. Cl. 364—165 **17 Claims**

1. A process control apparatus which is adapted optimally to a disturbance, comprising:

feedback control means for outputting a feedback control signal that is computed by comparing and adjusting a set value and a process variable;

feedforward control means, responsive to a disturbance signal, for outputting disturbance compensation signal based upon a feedforward control model having a gain;

gain scheduling means for correcting a gain of the feedback control signal from said feedback control means in response to the magnitude of variations in the disturbance compensation signal from said feedforward control means;



means for adding the feedback control signal that has been gain corrected by said gain scheduling means and the disturbance compensation signal from said feedforward control means to obtain a manipulated variable; and

feedforward control model gain adaptive means for outputting a correction signal to said feedforward control model, said correction signal being computed by comparing and equalizing the manipulated variable with the disturbance compensation signal.

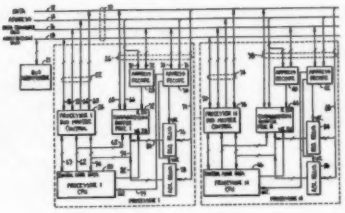
4,698,746
MULTIPROCESSOR COMMUNICATION METHOD AND APPARATUS

Arthur Goldstein, Aromas, Calif., assignor to Ramtek Corporation, Santa Clara, Calif.

Filed May 25, 1983, Ser. No. 498,024

Int. Cl.[4] G06F *13/42*

U.S. Cl. 364—200 **5 Claims**



1. In a computer system wherein N processors, each having a unique identity code, communicate with one another over a system bus and further wherein control of the system bus resides in one of said processors at any point in time, an apparatus for synchronizing communication between said processors, wherein sending processors transfer information to target processors, comprising

N bus master control means for controllably coupling the N processors to the system bus, each of which is associated with a different one of said N processors and each of which provides a communications path between the system bus and its associated processor when the associated processor controls the system bus, and each of which removes the communications path between the system bus and its associated processor when the associated processor is not controlling the system bus;

N separate storage means, each of which is coupled to a different one of said N processors and to the system bus independently of the associated bus master control means, for receiving and storing request signals and acknowledgment signals, wherein said request signals are supplied to

said storage means associated with a target processor by sending processors which seek to transfer data to the target processor, the request signals comprising a request address including the target processor identity code and request data including the sending processor identity code, and the acknowledgment signals comprising an acknowledgment address including the sending processor identity code and acknowledgment data including the target processor identity code, and further wherein each of the storage means comprise

request register means coupled to the system bus and to an associated processor and responsive to the requet signal for storing the request data present in said request signal whenever the identity code of the associated processor is present in the request address of said request signal, wherein each request register means comprise

first means for detecting the presence of the identity code of the associated processor in the request address and for generating an write enable signal in response thereto;

a first N-bit register wherein each bit position corresponds uniquely to one of the N processors in the computer system; and

first means for evaluating the request data to determine the identity of the sending processor and for setting the bit corresponding to the sending processor in the N-bit register whenever the first detecting means generates the write enable signal; and

acknowledgment register means coupled to the system bus and to the associated processor and responsive to the acknowledgment signal for storing the acknowledgment data in said acknowledgment signal whenever the identity code of the associated processor is present in the acknowledgment address of said acknowledgment signal; and

N communication buffer means each of which is coupled to a different sending processor and to the system bus independently of the associated bus master control means, for receiving and storing the information sought to be transferred by its associated sending processor, wherein each communication buffer means is coupled to its associated sending processor independently of the system bus, whereby the target processors can access the communication buffer means independently of the sending processor activity and the sending processors can communicate on the system bus independently of the contents of their associated communication buffers, and whereby the target processors can write an acknowledgment signal into the storage means associated with the sending processor to indicate that the information has been successfully transferred.

4,698,747

INSTRUCTION ADDRESS CALCULATION UNIT FOR A MICROPROCESSOR

Robert R. Thompson; David S. Mothersole, both of Austin, Tex., and Douglas B. MacGregor, Kyoto, Japan, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 28, 1985, Ser. No. 750,396
Int. Cl.[4] G06F *13/38*
U.S. Cl. 364—200 **4 Claims**

1. An execution unit for use in a microprocessor, comprising:

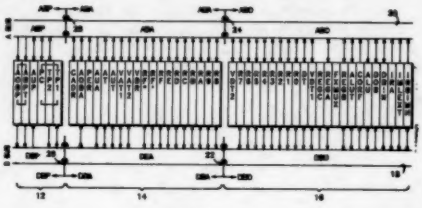
a data section for performing arithmetic and logic operations on data,

an address section for generating data addresses,

a program section for generating instruction addresses,

a data bus having a data segment selectively coupleable to the data section of the execution unit, an address segment selectively coupleable to the address section of the execution unit, and a program segment selectively coupleable to the program section of the execution unit, the data and program segments of the data bus being selectively coupleable to the address segment thereof; and

an address bus having a data segment selectively coupleable to the data section of the execution unit, an address segment selectively coupleable to the address section of the execution unit, and a program segment selectively coupleable to the program section of the execution unit, the data and program segments of the address bus being selectively coupleable to the address segment thereof.

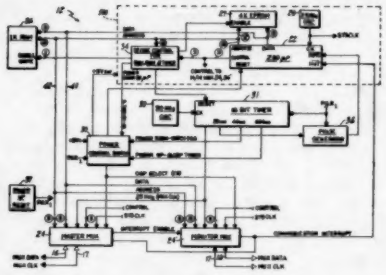


4,698,748

POWER-CONSERVING CONTROL SYSTEM FOR TURNING-OFF THE POWER AND THE CLOCKING FOR DATA TRANSACTIONS UPON CERTAIN SYSTEM INACTIVITY

David L. Juzswik, Dearborn Heights; Nathaniel Webb, Detroit, and William M. Floyd, Livonia, all of Mich., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed Oct. 7, 1983, Ser. No. 540,582
Int. Cl.[4] G06F *15/00, 11/30*
U.S. Cl. 364—200 **17 Claims**



1. In a control system for conducting clocked data transactions between a central control station and one or more remote controllers connected therewith, means for clocking said central control station and said remote controllers for said data transactions, the central control station including electronic signal processing means for controlling data transactions and for controlling said clocking of said transactions, said control system being powered by a limited capacity electrical power source, and said clocking for data transactions consumming power at said central control station and at said remote controllers, the improvement comprising:

power switch means coupled to the power source and to a portion of said central control station for selectively connecting or disconnecting said power source to said central control station portion in response to respective power-connect or power-disconnect control signal, said central control station and said remote controllers each comprising large-scale integrated circuitry;

at least one of said remote controllers for connecting with data input means for receiving certain input data,

said signal processing means monitoring input data to said at least one of said remote controllers via said data input means and, in response to said input data being representa-

tive of a predetermined condition of inactivity, entering a power-down control mode for issuing a clocking control signal for terminating said clocking at said central control station and a power-down control signal;

timing means for timing a predetermined interval during which power is disconnected from said central control station portion and for generating a power-up control signal at the end of said interval; and

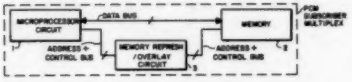
control circuit means coupled to said power switch means and responsive to said power-down control signal for generating said power-disconnect control signa and responsive to said power-up control signal for generating said power-connect control signal.

4,698,749

RAM MEMORY OVERLAY GATE ARRAY CIRCUIT

Nataraj Bhadriraju, Phoenix, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Oct. 18, 1985, Ser. No. 789,213
Int. Cl.[4] G06F *13/08*
U.S. Cl. 364—200 **16 Claims**



1. In a digital processing system having a processor with a clock and a RAM memory for storing data and program code instructions, a RAM memory overlay circuit is connected between said processor and said RAM memory for expanding the addressable RAM memory area, said RAM memory overlay circuit comprising:

processor address bus means connected to said processor, said processor address bus means being operated to transmit memory addresses for accessing said data and said program code instructions stored in said memory;

address multiplexing means connected to said processor address bus means and to said memory, said address multiplexing means being operated to transmit said memory addresses to said memory;

detecting means connected to said processor and being operated to determine whether a particular memory access is addressed for said program code instruction area of said memory or for said data area of memory, said particular memory address being identical for accessing said program code instruction area and said data area of memory;

said detecting means being further operated to produce a code signal or a data signal corresponding to a particular memory access being directed to said program code instruction area or to said data area respectively;

selecting means connected to said processor address bus means, said detecting means and said address multiplexing means, said selecting means being operated in response to said data signal to relocate said memory address for said access to said data area of memory; and

said selecting means being further operated in response to said code signal to transmit said memory address to memory identically as transmitted from said processor.

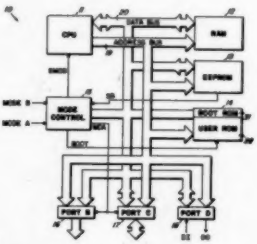
4,698,750

SECURITY FOR INTEGRATED CIRCUIT MICROCOMPUTER WITH EEPROM

Brian F. Wilkie; Michael Gallup; John Suchyta, and Kuppuswamy Raghunathan, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 27, 1984, Ser. No. 686,785
Int. Cl.[4] G06F *11/00*
U.S. Cl. 364—200 **19 Claims**

1. In an integrated circuit microcomputer having on-board memory including an EEPROM and having detection means for detecting a request for a mode of operation of the microcomputer and characterized as having a first mode of operation in which contents of the EEPROM can be read externally from the microcomputer, and a second mode of operation in which the contents of the EEPROM cannot be externally read from the microcomputer, means for securing the contents of the on-board memory, comprising:



an EEPROM security bit which can be set after the EEPROM has been loaded and which is erasable only if the EEPROM is also erased; and

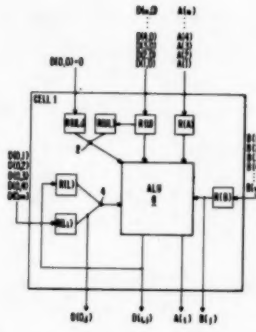
first means, coupled to the detection means, for erasing the contents of the EEPROM in response to the detection means receiving a request for the first mode of operation when the security bit is set.

4,698,751

SYSTOLIC ARRAY FOR SOLVING CYCLIC LOOP DEPENDENT ALGORITHMS

Bahram A. Parvin, Fountain Valley, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed Jul. 13, 1984, Ser. No. 630,615
Int. Cl.[4] G06F *9/40*
U.S. Cl. 364—200 **9 Claims**



1. A systolic array for solving an algorithm having cyclic loop dependency, in which two nested loops are executed n and m times, respectively; and the systolic array solves the algorithm in n+m+1 steps said array comprising:

many identical cells serially connected to form a chain, so that each cell, except for first and last cells in the chain, is connected only to its two adjacent cells, while the first and last cells in the chain are connected only to their sole adjacent cells; wherein

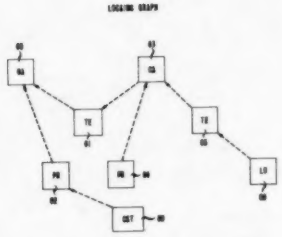
at certain moments during said algorithm solving, more than one cell is activated to perform a part of said solving so that the total time required to solve the algorithm is a linear function of the numbers of times the loops are executed.

4,698,752

DATA BASE LOCKING

Alan J. Goldstein, Livingston, and Terry R. Nusser, Flemington, both of N.J., assignors to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 441,732, Nov. 15, 1982, abandoned.
This application Apr. 29, 1986, Ser. No. 858,085
Int. Cl.[4] G06F *15/40*
U.S. Cl. 364—200 9 Claims



1. In a data base management system, a method for locking records comprising the steps of

(1) creating a directed acyclic locking graph of information records in said data base system, said locking graph associating related subsets of said records with a common root record,

(2) accessing a record in said data base system,

(3) for each record accessed, using said locking graph to identify a closest root record of said accessed record, and

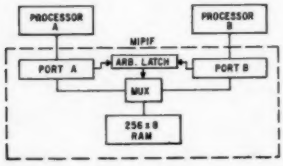
(4) locking said root record to prevent concurrent access to said accessed record.

4,698,753

MULTIPROCESSOR INTERFACE DEVICE

Stephen J. Hubbins, Kempston; David G. England, Wellingborough; Andre Szczepanek, Bedford, and David Norvall, Swindon, all of England, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 9, 1982, Ser. No. 440,380
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 13 Claims



1. A multiprocessor interface device comprising:

a random access memory;

first and second processor interfaces, each having a port for connection to a corresponding processor, each of said processor interfaces comprising

a bidirectional address/data bus for bidirectionally connecting address or data information between said corresponding processor and said multiprocessor interface device,

a processor control bus for receiving control signals from said corresponding processor, said received control signals including at least an access request control signal;

an interface control bus for transmitting control signals to said corresponding processor, said transmitted control signals including at least a ready control signal having a first logic state indicating that access to said random access memory is granted, and having a second logic state indicating that access to said random access memory is not granted; and

an address pointer register, connected to said bidirectional address/data bus, connected to said random access memory, and addressable by said corresponding processor, for storing address information;

an arbitration latch connected to said random access memory, said first processor interface and said second processor interface for

connecting only one of said first and second processor interfaces to said random access memory,

causing said one processor interface to transmit its ready control signal at said first logic state to the corresponding processor indicating access is granted, and

causing the other processor interface to transmit its ready control signal at said second logic state to the corresponding processor indicating access is not granted, said arbitration latch controlled by said access request signals to grant access to said first and second processor interfaces on a first-come first-served basis; and

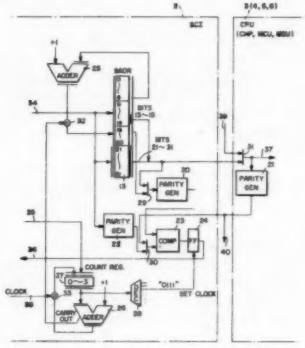
an address equal detector, connected to said address pointer registers of said first processor interface and to said address pointer register of said second processor interface, for generating an address register equal signal when the contents of said address pointer register of said first processor interface and the contents of said address pointer register of said second processor interface are equal.

4,698,754

ERROR DETECTION OF SCAN-OUT IN A DIAGNOSTIC CIRCUIT OF A COMPUTER

Minoru Koshino, Yokohama, and Yasuo Matsumoto, Ebina, both of Japan, assignors to Fujitsu Limited, Kawaski, Japan

Filed Jun. 24, 1983, Ser. No. 507,495
Claims priority, application Japan, Jun. 25, 1982, 57-109605
Int. Cl.[4] G06F *11/10*
U.S. Cl. 364—200 6 Claims



4. A scan address checking system in a data processing system having a device to be scanned and a scan function, the data processing system providing an input scan address to said scan address checking system, said scan address checking system comprising:

a scan address register, operatively connected to receive the input scan address, for storing a registered scan address and providing an operation scan address to the device;

comparison means, operatively connected to said scan address register and to receive the input scan address, for comparing the input scan address with the registered scan address and for comparing the registered scan address with the operation scan address provided to the device

and providing a comparison output indicating whether the registered scan address matches the input scan address and the operation scan address, said comparison means comprising:

a first parity generator in the device to be scanned, operatively connected to said scan address register, for generating a first parity signal;

a second parity generator, operatively connected to said scan address register, for generating a second parity signal;

a third parity generator, operatively connected to receive the input scan address, for generating a third parity signal; and

a parity comparator, operatively connected to said first, second and third parity generators, for comparing the first and third parity signals with the second parity signal;

first gate means, operatively connected to said scan address register and said second parity generator, for selecting portions of the registered scan address for input into said second parity generator; and

second gate means, operatively connected to said first and third parity generators and said parity comparator, for selecting between said first and third parity generators for input to said parity comparator.

4,698,755

PRINTER CONTROL SYSTEM AND METHOD OF DESIGNATING FUNCTIONS OF PRINTER

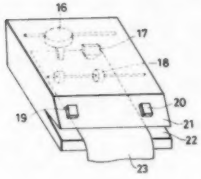
Kenichi Okazaki, Owariasahi; Kunio Morimoto, Seto; Kazumi Sawano, and Masami Aoki, both of Owariasahi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 3, 1985, Ser. No. 751,590

Claims priority, application Japan, Jul. 3, 1984, 59-136574

Int. Cl.[4] G01D *15/00*

U.S. Cl. 364—519 **10 Claims**



1. A printer control system having a printer, and a control unit connected to and for controlling said printer wherein:

(a) said control unit comprises a first memory for storing function information for designating a function of said printer, which function can be varied when a job to be performed by said printer is varied, and printing data, and a control means for outputting a control code for use in controlling a mechanism which constitutes said printer; and

(b) said printer comprises a second memory for storing therein the function information and printing data which are transferred from said first memory in said control unit thereto, a mechanism for feeding a printing medium, a printing mechanism driven in accordance with a control code transmitted from said control means, and printing the printing data, which are outputted from said second memory, on said printing medium, a key control means for designating the feeding and discharging of said printing medium from said mechanism for feeding, and a processor means for controlling, in accordance with the function information read from said second memory, a designation operation, which is carried out by said key control means, so that the content of the designation operation can be varied.

4,698,756

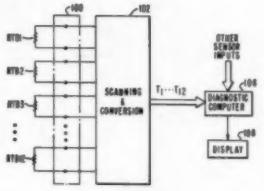
GENERATOR STATOR WINDING DIAGNOSTIC SYSTEM

Avelino J. Gonzalez, Forest Hills, Pa.; Franklin J. Murphy, Oviedo, Fla.; Franklin T. Emery, Orlando, Fla.; Perry A. Weyant, Winter Springs, Fla., and William G. Craig, Casselberry, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 16, 1985, Ser. No. 755,513

Int. Cl.[4] G01K *3/02, 7/02, 13/00;* **G06F** *15/36*

U.S. Cl. 364—557 **14 Claims**



13. Diagnostic apparatus for diagnosing the winding system of an electrical generator having a plurality of coil sections with internal first and second vent tube stacks through which a cooling gas is passed, comprising:

(A) monitoring means for monitoring the temperature of cooling gas emerging from said first and second vent tube stacks of selected ones of said coil sections and operable to provide corresponding first and second temperature indicative signals;

(B) diagnostic computer means being responsive to said first and second temperature indicative signals and operable to generate therefrom corresponding first and second normalized temperature indicative signals;

(C) said diagnostic computer means being further operable to test said normalized signals to see if they fall below, within or above a normal range and to generate respective confidence factors in the existence of a said signal being below, within or above said normal range;

(D) said diagnostic computer means being responsive to said confidence factors and operable to generated respective confidence factors in the existence of various predetermined combinations of said signals below, within or above said normal range;

(E) said diagnostic computer means being responsive to said confidence factors in the existence of said predetermined combinations to generate respective confidence factors in the existence of predetermined abnormal conditions as a function of the existence of various ones of said combinations; and

(F) means for communicating said latter confidence factors together with their corresponding abnormal condition indication, to an operator.

4,698,757

TERMINAL PROCEDURE FOR UTILIZING HOST PROCESSOR LOG ON AND LOG OFF PROMPTS

David M. Dill, Roanoke, and Holly F. Redmond, Arlington, both of Tex., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Nov. 15, 1984, Ser. No. 671,863

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—300 **6 Claims**

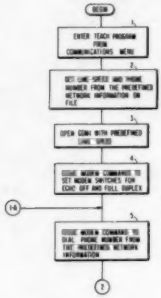
1. In a data processing system wherein one or more host data processors may be accessed by a plurality of remote terminals via a communication network, a procedure for automatically logging on and off a selected host data processor comprising the steps of:

establishing a connection via said communication network between said host data processor and one terminal of said plurality of remote terminals;

displaying prompts for user responses from said host data processor at said one terminal;

constructing a table internal to said one terminal of prompts from said host data processor and corresponding responses from a user when a user logs on to said host data processor;

storing said table in said terminal for later access; and



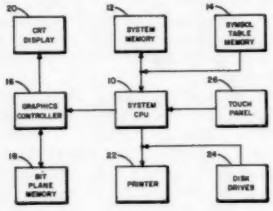
thereafter accessing said table of prompts and corresponding responses by said one terminal and matching received prompts from said host data processor with prompts in said table to automatically generate the required user responses to said host data processor prompts for logging on to said host data processor.

4,698,758

METHOD OF SELECTING AND REPRODUCING LANGUAGE CHARACTERS

Theodore E. Larsen, Edina, Minn., assignor to Intech-Systems, Inc., Minneapolis, Minn.

Filed Mar. 25, 1985, Ser. No. 715,827
Int. Cl.[4] G06F *15/38*; B41J *5/00*
U.S. Cl. 364—419 **21 Claims**



1. A method of selecting language characters from a plurality of prestored groups of language characters arranged according to the phonetic sound and intonation of the language characters, comprising the steps of:

(a) displaying a first group of symbols representative of the phonetic sounds of said characters, arranged according to a phonetic alphabet;

(b) selecting from said first group at least one of said symbols representative of the phonetic sound of a desired character;

(c) displaying a second group of symbols representative of the intonations of the selected symbols of said first group, and displaying the language characters associated with the symbols representative of intonations;

(d) selecting, from the displayed language characters, the desired language character; and

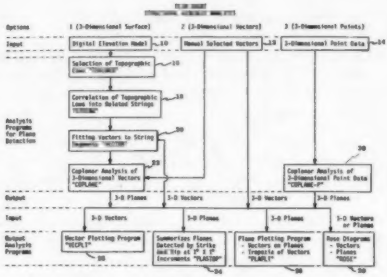
(e) reproducing the selected desired language character.

4,698,759

PROCESS FOR STRUCTURAL GEOLOGIC ANALYSIS OF TOPOGRAPHY AND POINT DATA

Jay R. Eliason, and Valerie L. C. Eliason, both of Richland, Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 28, 1985, Ser. No. 716,981
Int. Cl.[4] G01V *3/18*
U.S. Cl. 364—420 **2 Claims**



1. The method of analyzing topographical data to detect and plot geological fracture and/or bedding planes, comprising:

inputting a matrix of data derived from undulations of the earth into a computer memory wherein said matrix comprises point elevations over a geographical area corresponding to said matrix,

comparing said point elevations within a predetermined detection area smaller than said geographical area to determine lower points identified as valley points,

assembling adjacent valley points into strings, and said strings into vectors of substantially common direction,

comparing vectors to determine vectors lying in substantially common planes, and

outputting data identifying said substantially common planes.

4,698,760

METHOD OF OPTIMIZING SIGNAL TIMING DELAYS AND POWER CONSUMPTION IN LSI CIRCUITS

Robert F. Lembach; Steven D. Lewis, and Robert R. Williams, all of Rochester, Minn., assignors to International Business Machines, Armonk, N.Y.

Filed Jun. 6, 1985, Ser. No. 741,922
Int. Cl.[4] G06F *15/60*
U.S. Cl. 364—490 **6 Claims**

1. A method of optimizing signal timing delays and power consumption through multi-path LSI circuit networks constructed from a plurality of circuit blocks, each circuit block having associated therewith a plurality of selectable power drive levels which determine circuit block signal timing delays, the objective of the method being to reduce an LSI circuit network signal timing delay to less than a predetermined maximum signal timing delay while at the same time achieving the lowest LSI circuit network power consumption consistent therewith, comprising the steps of

(a) determining the timing delays and power consumption

characteristics of each circuit block for all of the plurality of power drive levels;

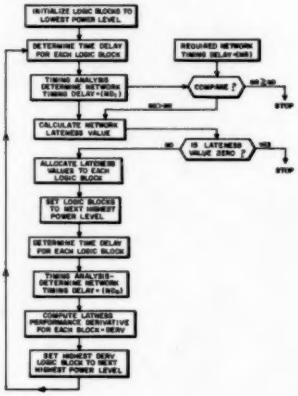
(b) calculating the timing delays, at a first power drive level, through all of the circuit blocks and determining the circuit network timing delays by summing circuit block timing delays through the multi-path circuit network;

(c) calculating a "slack time" value for each circuit block by subtracting the circuit network timing delays from the maximum permissible circuit network timing delays, and allocating this difference as a "slack time" value for each circuit block according to its relative timing delay through the multi-path circuit network;

(d) calculating a "lateness time" value for each of the circuit blocks by summing the circuit block "slack time" values through the multi-path network of circuit blocks which contribute to circuit network timing delays;

(e) repeating step (b)–(d) at a second power drive level;

(f) forming a performance derivative for each circuit block by subtracting the second power drive level "lateness


INITIALIZE LOGIC BLOCKS TO LOWEST POWER LEVEL
DETERMINE TIME DELAY FOR EACH LOGIC BLOCK
REQUIRED NETWORK TIMING (DELAY=DR)
TIMING ANALYSIS DETERMINE NETWORK TIMING DELAY=(ND)
COMPARE ?
STOP
CALCULATE NETWORK LATENESS VALUE
IS LATENESS VALUE ZERO ?
STOP
ALLOCATE LATENESS VALUES TO EACH LOGIC BLOCK
SET LOGIC BLOCKS TO NEXT HIGHEST POWER LEVEL
DETERMINE TIME DELAY FOR EACH LOGIC BLOCK
TIMING ANALYSIS-DETERMINE NETWORK TIMING DELAY=(ND2)
COMPUTE LATNESS PERFORMANCE DERIVATIVE FOR EACH BLOCK=DERV
SET HIGHEST DERV LOGIC BLOCK TO NEXT HIGHEST POWER LEVEL

time" value from the first power drive level "lateness time" value, and dividing the result by a denominator formed by subtracting the second power drive level power consumption from the first power drive level power consumption;

(g) identifying the circuit blocks having the highest performance derivatives, and setting the power drive level of at least one of such circuit blocks to the second level while returning the remaining circuit blocks to the first power drive level;

(h) repeating the steps (b)–(g) by substituting the power drive level selected in step (g) for the original first power drive level, and substituting an incrementally increased power drive level for each circuit block for the second power drive level, until all circuit blocks "lateness time" values are reduced to substantially zero; and

(i) physically implementing in the LSI circuit network the power drive levels of each circuit block as determined from step (h) as the operable power drive levels of each of the circuit blocks.

4,698,761

AUTOMATIC TUNNEL DETECTOR FOR A SELF-PROPELLED TRACTION VEHICLE

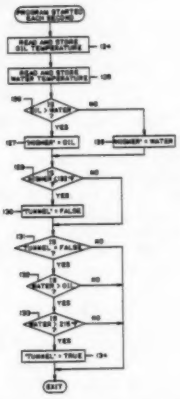
Charles E. Cooper, and Glenn E. Vest, both of Erie, Pa., assignors to General Electric Company, Erie, Pa.

Filed Mar. 21, 1985, Ser. No. 714,581
Int. Cl.[4] G06F *15/04*
U.S. Cl. 364—424 **11 Claims**

1. A tunnel detector for a locomotive having an on-board thermal prime mover which is cooled by a coolant and lubricated by lube oil, the temperature of said coolant being lower than a predetermined magnitude under normal operating conditions of the locomotive, comprising:

a. means for sensing the temperature of the coolant;

b. means for sensing the temperature of the lube oil; and



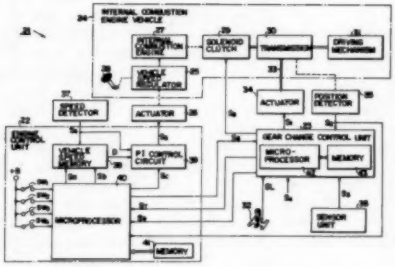
c. means connected to both of said temperature sensing means for automatically indicating that the locomotive is in a tunnel if the sensed coolant temperature is above said predetermined magnitude and is higher than a variable reference level determined by the sensed lube oil temperature.

4,698,762

CRUISE CONTROL APPARATUS FOR VEHICLES

Koichi Moriya, and Hidekazu Oshizawa, both of Higashimatsuyama, Japan, assignors to Diesel Kiki C., Ltd., Japan

Filed Feb. 25, 1985, Ser. No. 704,732
Claims priority, application Japan, Feb. 23, 1984, 59-31393
Int. Cl.[4] B60K *31/04;* **G05D** *13/52;* **F16H** *5/66*
U.S. Cl. 364—424.1 **3 Claims**



1. A cruise control apparatus for a vehicle having an internal combustion engine supplied with fuel and a transmission which is operated to shift gear positions by an actuator in response to a gear shift signal and is connected through a clutch to the internal combustion engine, said apparatus comprising:

regulating means for regulating the amount of fuel supplied to the internal combustion engine in response to a driving signal;

speed detecting means for detecting an actual speed of the vehicle at each instant;

engine control means providing the driving signal for controlling said regulating means in response to an output signal from said speed detecting means so as to maintain the vehicle speed at a desired preset speed for cruise control operation, said engine control means including means for temporarily releasing and resuming the cruise control operation in response to release and resume input signals;

gear position detecting means for detecting an actual gear position of the transmission at each instant;

a fuel amount detector for detecting the amount of fuel supplied to the engine; and

a gear change control unit having a microprocessor and a control program which are responsive to said fuel amount detector, said gear position detecting means, and at least one signal indicating an operating condition of the engine for calculating an optimum gear position of the transmission for minimum fuel consumption when the amount of fuel supplied to the engine is not a maximum amount or zero, and for setting a desired preset gear position one gear position lower than the current gear position when the amount of fuel supplied to the engine is a maximum amount of zero,

said gear change control unit further having means for providing a release signal to said engine control means for temporarily releasing the cruise control operation and a gear shift signal to the transmission actuator in order to carry out a gear shift operation when the actual gear position detected by said gear position detecting means is not in the optimum gear position or the preset gear position, and for providing a resume signal to said engine control means for resuming the cruise control operation when the gear shift operation is completed.

4,698,763

AUTOMATIC MECHANICAL TRANSMISSION CONTROL

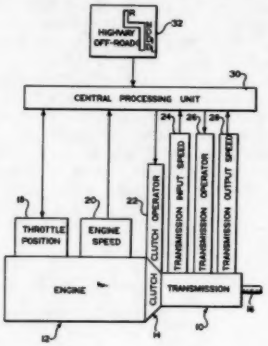
Robert R. Smyth, Bloomfield Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio

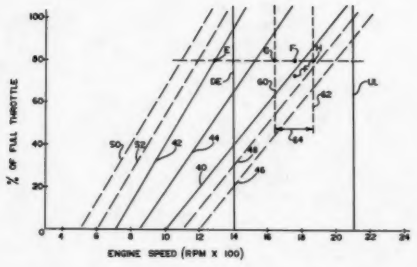
Filed Mar. 15, 1985, Ser. No. 712,069
Int. Cl.[4] B60K *41/08*
U.S. Cl. 364—424.1 **10 Claims**

1. An improved automatic transmission system for vehicles having a throttle-controlled engine, an operator actuated throttling control means and a transmission having a plurality of gear ratio combinations selectively engagable between a transmission input shaft and a transmission output shaft, said transmission input shaft being operatively connected to said engine, said transmission system including an information processing unit having means for receiving a plurality of input signals including (1) an input signal indicative of the position of said throttle controlling means, (2) an input signal indicative of the rotational speed of said engine, and (3) an input signal indicative of the speed of said vehicle, and (4) an input signal indicative of the direction of the last shift, said processing unit including means for processing said input signals in accordance with a program to select a desirable gear ratio for a given combination of input signals and for generating output signals whereby said transmission system is operated in accordance with said program, and means associated with said transmission effective to actuate said transmission to effect engagement of one of said gear ratio combinations in response to said output signals from said processing unit, said program having a first mode of operation and a second mode of operation, at least one of (a) the engine speeds at which said processing unit commands upshifts after a downshift being greater in said second than in said first mode of operation and (b) the engine speeds at which said processing unit commands downshifts after an upshift being less in said second mode than in said first mode of operation, said processing unit having means to set said program to said second mode of operation, the improvement characterized by:

said processing unit including means for processing said input signals to provide a calculated expected engine speed value indicative of the expected rotational speed of the engine in the selected gear ratio combination at the existing vehicle speed at the time of the last shift,

said means to reset said program to said first mode of operation including means to calculate a minimum reset engine speed value and a maximum reset engine speed value as a function of said expected engine speed at the time of





engagement of the last engaged gear ratio, and means to reset said program to said first mode thereof in response to engine speed exceeding said maximum reset value or engine speed being less than said minimum reset value;

said minimum reset engine speed value being less than said expected engine speed value and said maximum reset engine speed value being greater than said expected engine speed value.

4,698,764

DIAGNOSTIC APPARATUS FOR CONTINUOUSLY VARIABLE TRANSMISSION

Takafumi Inagaki, Toyota; Hiroshi Sasaoka, Okazaki; Susumu Masutomi, Anjyo; Hiroshi Itoh, and Mitsuru Takada, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

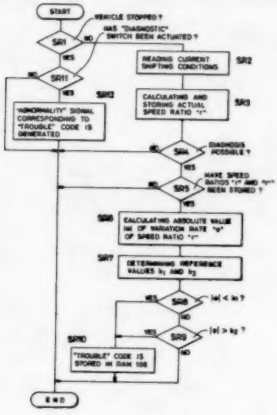
Filed Jan. 24, 1985, Ser. No. 694,280
Claims priority, application Japan, Jan. 26, 1984, 59-14010
Int. Cl.[4] B60K *41/00*
U.S. Cl. 364—424.1 **29 Claims**

1. In an automatic vehicle having (a) a continuously variable transmission for transmitting the output of an engine to drive wheels at a steplessly variable speed ratio, (b) a control system operable to determine a target speed ratio of the transmission, and (c) a shift-regulating device responsive to the control system to control the speed ratio of the transmission so that an actual speed ratio of the transmission coincides with said target speed ratio, a diagnostic apparatus for checking whether the

speed ratio of said transmission is normally controlled, said diagnostic apparatus comprising:

detecting means for detecting said actual speed ratio of said transmission;

calculating means for determining a difference between said target speed ratio and said actual speed ratio of the transmission;



memory means storing data for determining a normal range of said difference between said target speed ratio and said actual speed ratio of the transmission; and

judging means for checking whether or not the determined difference falls within said normal range.

4,698,765

IGNITION TIMING CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

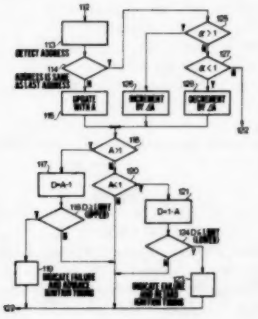
Kunihiro Abe, Higashimurayama; Yoshitake Matsumura, Hachiouji, and Takurou Morozumi, Mitaka, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 22, 1985, Ser. No. 757,816

Claims priority, application Japan, Jul. 27, 1984, 59-158030

Int. Cl.[4] F02P 5/14

U.S. Cl. 364—431.04 **2 Claims**



1. An ignition timing control system for an automotive engine in which the amount of fuel to be supplied to the engine is controlled by updated data, and the ignition timing is controlled dependent on the amount of the fuel, comprising;

a table storing data;

an O_2-sensor for detecting the concentration of exhaust gases of the engine and for producing a feedback signal dependent on the concentration;

first means for updating the data in the table with a value relative to the feedback signal;

second means for comparing the updated data with predetermined upper and lower limits; and

third means for adjusting the ignition timing of the engine, when the updated data exceeds the upper or lower limit.

4,698,766

INDUSTRIAL PROCESSING AND MANUFACTURING SYSTEMS

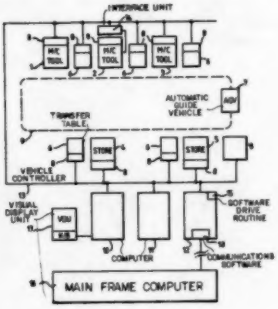
Brian Entwistle; Peter Roberts, and John M. Rogerson, all of Preston, England, assignors to British Aerospace PLC, London, England

Filed May 17, 1985, Ser. No. 735,105

Claims priority, application United Kingdom, May 19, 1984, 8412854; Mar. 12, 1985, 8506365

Int. Cl.[4] G05B 19/00

U.S. Cl. 364—468 **1 Claim**



1. An installation which comprises a plurality of computer controlled processing facilities linked to a computerised control system and which is operable automatically for carrying out industrial processing jobs each involving the performance, in sequence, of one or more items of work from each of a plurality of different kinds of activity, the control system being programmed with software in the form of a plurality of function performing modules able to communicate one with another on a service-provider and client basis via a common communication facility, and said modules including:

a plurality of server modules for providing respective ones of a series of elemental services including low-level access to and control of computer file storage,

a plurality of controller modules for controlling respective ones of said facilities to perform said items of work,

a plurality of activity manager modules each of which is responsible for controlling one or more controller modules associated with the same activity, and

a job-route sequencing module which is operable for using a file access server module to obtain from a stored job file information concerning jobs to be carried out and the items of work associated with each such job,

the job-route sequencing module being further operable for distributing said items of work in the sequence in which they are to be carried out to the appropriate ones of said activity manager modules and for maintaining track of the progress of each job by receiving from the activity manager modules indications that particular items of work previously passed to them have been completed, each activity manager module being further operable for receiving the items of work distributed to it by the job-route sequencing module, for maintaining a queue of such items, for passing the items in sequence to the controller module or an appropriate one of the

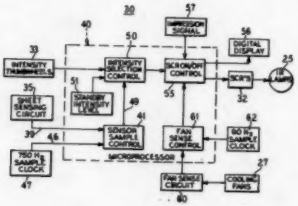
controller modules for which it is responsible, and for passing back to the job-route sequencing module an indication of completion of each item of work, and each controller module being operable for requesting a new item of work from its associated activity manager module, for receiving any such work item passed to it as a result of said request and for then controlling the associated facility to carry out that item of work.

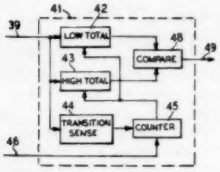
4,698,767

APPARATUS AND METHOD FOR CONTROLLING INFRARED DRYER FOR DISCREET ARTICLES

Neil D. Wensel, Cary; Gary E. Norris, Hoffman Estates, and Craig G. Beierwaltes, Rolling Meadows, all of Ill., assignors to Electro Sprayer Systems, Inc., Schiller Park, Ill.

Filed Aug. 14, 1985, Ser. No. 765,549
Int. Cl.[4] G06F *15/46*; H05B *1/02*; G01V *9/04*; G06M *7/06*
U.S. Cl. 364—471 **11 Claims**





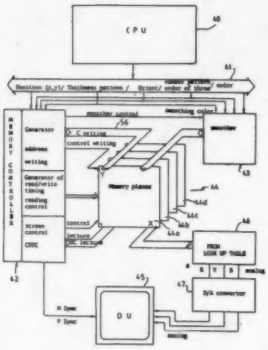
1. Control apparatus for controlling a device in response to the presence or absence of articles in a predetermined space, as the articles are moved by a series of conveyors along a path through said space, said control apparatus comprising: detector means disposed adjacent said path and responsive to the presence of an article or carrier structure for producing a first binary signal level and responsive to the absence of articles or carrier structure for producing a second binary signal level, said detector producing a predetermined number of transitions from each carrier while producing said first and second signal levels, processor means connected to said detector means and responsive thereto, said processor means including transition counting means for cyclically counting from zero to said predetermined number of transitions while said first and second signal levels are produced so that said predetermined number of transitions represents the passage of a carrier, and said processor means including means for comparing the total time durations of said first and second signal levels during said predetermined number of transitions for producing a first control signal when the ratio of said first signal level duration to said second signal level duration exceeds a predetermined ratio and for otherwise producing a second control signal.

4,698,768

PROCESS FOR SMOOTHING THE CURVES GENERATED IN A TELEVISION SCANNING SYSTEM

Pham D. Thuy, Chatenay Malabry, and Dominique Vanypre, Igny, both of France, assignors to SFENA-Societe Francaise d'Equippements pour la Navigation Aereenne, Velizy-Villacoublay, France

Continuation-in-part of Ser. No. 246,223, Mar. 23, 1981, abandoned. This application Jan. 30, 1984, Ser. No. 575,166
Claims priority, application France, Mar. 28, 1980, 80 06974
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—521 **14 Claims**



1. A process for plotting, from a theoretical curve, a corresponding curve with smoothing on a visualization surface of a visualization module, said visualization surface being divided into pixels in a first mesh network with given pitch, by causing, through scanning, the illumination of a number of pixels whose position is determined so as to obtain the form of the theoretical curve to be plotted, this process comprising the following steps:

previous storage of a predetermined number of patterns formed from at least two adjacent pixels disposed in the same line or in the same column, and each representing an elementary curve portion, these patterns being addressable as a function of the position in the pattern of said theoretical curve,

determination, by an incremental procedure, of the set of points best following said theoretical curve in a second mesh network,

determination of the closest pixels of said visualization surface to said determined points,

measurement of the distance e from each of said closest pixels to said theoretical curve,

determination, as a function of this distance e, of the pattern whose elementary curve portion corresponds to that of said theoretical curve to be plotted, and

illumination of said pattern on said visualization surface.

4,698,769

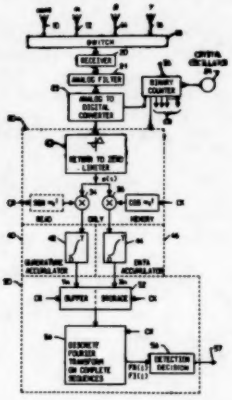
SUPERVISORY AUDIO TONE DETECTION IN A RADIO CHANNEL

Ross McPherson, Denville; Kenneth F. Smolik, Morristown, and David J. Thomson, Murray Hill, all of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 4, 1985, Ser. No. 698,095
Int. Cl.[4] G06F *7/38*
U.S. Cl. 364—724 **8 Claims**

4. Apparatus for detecting the presence of one of a plurality of supervisory audio tones (SAT) associated with a channel, said apparatus comprising

means for receiving said tone,
means for converting said tone from analog to digital form,
means for reducing spurious signals,
means for bifurcating said tone into first and second paths,
means for multiplying said tone in said first path by a cosine function and summing over a predetermined number of samples at predetermined times to obtain a real component of a complex number,
means for multiplying said tone in said second path by a sine function and concurrently summing to obtain an imaginary component of said complex number,



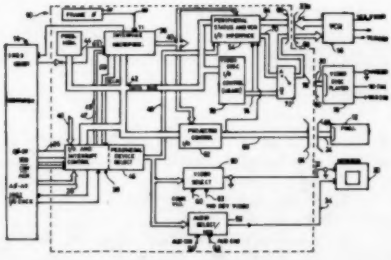
the aforesaid means being operated repeatedly to obtain a sequence of said complex numbers,
means for finding a maximum amplitude among a plurality of frequencies by performing a discrete Fourier transform on said complex numbers,
means for comparing said maximum amplitude with a threshold, and
means for delcaring the presence of a SAT when said maximum amplitude exceeds said threshold.

4,698,770

COMPUTER CONTROLLED VIDEO DEVICE AND SLIDE PROJECTOR INTERFACE ARRANGEMENT

Dev R. Rattan, Chicago, and Robert R. Parker, Wheeling, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 13, 1984, Ser. No. 570,466
Int. Cl.[4] G06F *3/00, 3/14, 9/00*
U.S. Cl. 364—900 **18 Claims**



1. Control interface apparatus for controlling the operation of a plurality of peripheral devices of different categories including an audio visual presentation device and a video device in response to received signals from a computer of the type separately providing address, control and data signals on address, control and data buses, the video devices capable of being controlled being of at least two different categories including video tape recorders and video disc players, the control interface apparatus comprising:

input/output means coupled to said computer address, control and data buses for receiving address, control and data signals from said computer and for sending data signals to said computer; said input/output means including

means responsive to predetermined address signals for generating a request for service signal;

said input/outut means including means responsive to said generating means and predetermined portions of the address signals for identifying the device category to be controlled; and

processor means coupled between said input/output means and said plurality of peripheral devices for controlling the operation thereof; said processor means being responsive to said device category identification means and said request for service signal for transferring data signals from said computer data bus to said input/output means; said transferred data signals including command data in a predetermined format, said command data representing a desired function or operation to be performed by one of said peripheral devices, said command data for similar functions and operations of the devices of different categories being identical; and

said processor means being responsive to said command data for controlling the operation of said one of said peripheral devices; wherein said command data including an audio/video selection segment and a command code segment; said audio/video selection segment includes a video selection code representing either system video or video device video and an audio code representing either no audio, video device audio one, video device audio two or video device audio one and two mixed; and at least one category of devices to be controlled includes two different device types, said command data including an audio-video-device segment and a command segment; and said audio-video-device segment is one data byte and said command segment includes at least one byte representing a function or mode of a device, predetermined command segments including additional bytes representing location of information of a device.

4,698,771

ADDER CIRCUIT FOR ENCODED PCM SAMPLES

Jeffrey P. Mills, Oak Park, and Max S. Macrander, Warrenville, both of Ill., assignors to GTE Communication Systems Corporation, Northlake, Ill.

Filed Dec. 31, 1984, Ser. No. 687,877
Int. Cl.[4] G06F *7/50, 7/38*
U.S. Cl. 364—768 **10 Claims**

1. An adder circuit for use in a digital sign processing system which includes a source of pulse code modulation (PCM) samples, each sample having sign, exponent and mantissa fields, said adder circuit comprising:

an exponent subtractor circuit, connected to said source of PCM samples, and operative to select one of said exponents from a pair of PCM samples, to provide signals representative of the difference in value of said exponents, and to provide signals identifying the selected exponent,

a mantissa shifter circuit, connected to said source of PCM samples and to said exponent subtractor circuit, and operative in response to said signals identifying the selected exponent to shift the mantissa associated with the other exponent by a number of bit positions equal to said difference in exponent values, whereby the mantissa of one sample is adjusted to reflect an exponent of the same value as the selected exponent;

a mantissa adder circuit comprising,

a sign bit exclusive-OR gate connected to said source of PCM samples and operative in response to sign bits of the

same value, from each of a sample pair, to provide a summation signal representative of the sum of said shifted mantissa and the mantissa associated with the selected exponent; and

further operative in response to sign bits, of different values from each of a sample pair to provide a difference signal representative of the difference between said shifted mantissa and the mantissa associated with the selected exponent,

a first plurality of exclusive-OR gates connected to said mantissa shifter circuit and to said sign bit exclusive-OR gate;

a binary adder connected to said plurality of exclusive-OR gates and to said mantissa shifter circuit;

said plurality of exclusive-OR gates being operative in response to said sign control signal of a first or second characteristic to gate or invert mantissa bits associated with one of said pair of PCM samples to said mantissa adder circuit;

said binary adder being operative to add said gated or inverted bits from said plurality of exclusive-OR gates to mantissa bits associated with the other of said pair of PCM samples, whereby the mantissas of said samples are added to or subtracted from each other depending on the value of their associated sign bits, after being adjusted to reflect a common exponent;

said binary added further operative to provide addition signals representative of the results of said add operation, and carry signals of first and second characteristics, indicating the presence and absence, respectively, of a carry condition during said add operations;

a sign bit generator connected to said source of PCM samples and said mantissa adder circuit comprising,

first and second AND gates, each having a first input connected to said source of PCM samples, and a second input connected to said binary adder;

said first AND gate being operative in response to said sign bit of a first value from one of said PCM samples and said carry signal of a first characteristic to provide a first gate signal;

said second AND gate being operative in response to said sign bit of a second value from the other of said PCM samples and said carry signal of a second characteristic to provide a second gate signal; and

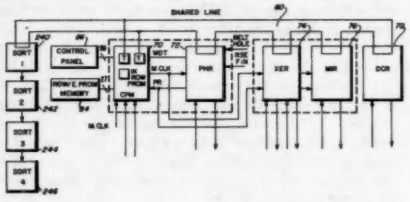
an OR gate connected to said first and second AND gates, and operative in response to said first or second gate signal to provide an output sign bit of a value representative of the results of said add operation.

4,698,772

REPRODUCTION MACHINE WITH A CHAIN OF SORTER MODULES AND A METHOD TO PERFORM CHAINING TASKS

Jeff C. Carter, Fairport, and Raymond R. Husted, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 21, 1982, Ser. No. 420,992
Int. Cl.[4] G06F *7/08*; G03G *15/00*
U.S. Cl. 364—900 **3 Claims**



1. A printing machine having a plurality of sorter modules, each of said sorter modules being controlled by an associated control element, said control elements being interchangeable, the method of controlling said sorter modules comprising the steps of

(1) sending a sort instruction to a first of said control elements identifying a sort operation,

(2) said first control element determining if its associated sorter module can complete the sort operation identified by the sort instruction,

(3) if the first control element associated sorter module cannot complete the sort operation, said first control element associated sorter completes a portion of the sort operation and sends the sort instruction to a second control element,

(4) said second control element determines that its associated sorter module can complete the sort operation identified by the sort instruction, and

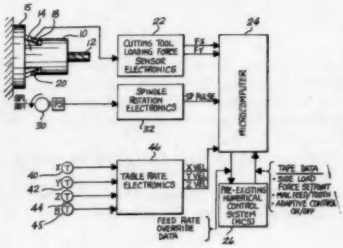
(5) said second control element controls operation of its associated sorter to complete the sort operation begun by the sorter module associated with the first control element.

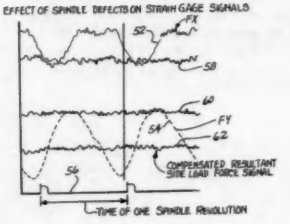
4,698,773

ADAPTIVE FEED RATE OVERRIDE SYSTEM FOR A MILLING MACHINE

Jan Jeppsson, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 31, 1986, Ser. No. 825,134
Int. Cl.[4] G05B *19/24, 19/00*
U.S. Cl. 364—474 **6 Claims**




EFFECT OF SPINDLE DEFECTS ON STRAIN GAGE SIGNALS
FX
FY
COMPENSATED RESULTANT SIDE LOAD FORCE SIGNAL
TIME OF ONE SPINDLE REVOLUTION

1. A system for adaptively limiting the feed rate or rate of translational movement of a rotating end mill during a milling operation, wherein the feed rate of said end mill is normally controlled by commands from a numerical control system, said feed rate limiting system comprising:

means for continuously sensing side loading force acting on said end mill during said milling operation, wherein said sensing means senses variations in said side loading force which occur over the period of each respective end mill revolution, and wherein said sensing means continuously generates a loading force signal as said end mill rotates

indicating the magnitude of said side loading force, including variations thereof during each revolution;

adaptive feed rate limiting means, connected to said sensing means, said limiting means monitoring the magnitude of said side loading force, as indicated by said generated signal, periodically a certan number of times during each end mill revolution, and determining from said monitoring the peak side loading force acting on said end mill during each revolution, and using said determined peak force to set a limit to end mill feed rate where said peak force substantially matches a preselected maximum loading force acting on said end mill, and further,

when said peak force changes from one revolution to the next, said adaptive feed rate limiting means further respondingly changes said feed rate limit, and in such situation, said adaptive feed rate limiting means calculates dynamic tool lag of said end mill which occurs when peak force changes from one revolution to the next, and uses said tool lag to adjust the magnitude of change in setting feed rate limit from one revolution to the next; and including

feed rate override means for limiting end mill feed rate to said set feed rate limit, regardless of the feed rate commanded by said numerical control system.

4,698,774

METHOD OF AND APPARATUS FOR CONTROLLING AUTOMATIC SOLDERING SYSTEM

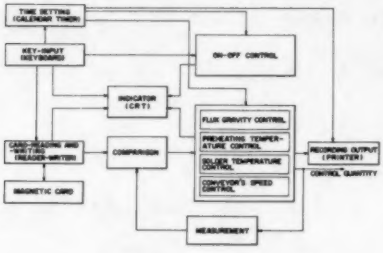
Nobuhide Abe, Iruma; Minoru Adachi, Niiza; Makoto Ito, Hoya, and Toshiya Uchida, Tokyo, all of Japan, assignors to Kabushiki Kaisha Tamura Seisakusho, Tokyo, Japan

Filed Sep. 27, 1985, Ser. No. 781,351

Claims priority, application Japan, Oct. 2, 1984, 59-206813

Int. Cl.[4] G06F *15/46*; B23K *31/02*

U.S. Cl. 364—477 **11 Claims**



1. An apparatus for controlling an automatic soldering system comprising a magnetic card recording at least a flux gravity setting value, a preheating temperature setting value, a solder temperature setting value and the work conveyor speed setting value, card-reading-and-writing means for reading out and writing said setting values recorded in said magnetic card, control means such as at least flux gravity control means, preheating temperature control means, solder temperature control means and work conveyor speed control means in an automatic soldering system controlled on the basis of respective setting values read out from said card-reading-and writing means, measuring means for measuring control amounts of respective control means, comparing means for comparing measured values of respective control means with the setting values of said magnetic card and supplying control inputs to respective control means, key-input means for writing respective setting values on said magnetic card by way of said card-reading-and-writing means, on-off type control means which can be on-off-operated by said key-input means and a display means for displaying the working conditions of said key-input means, said card-reading-conditions and-writing means and respective control means.

4,698,775

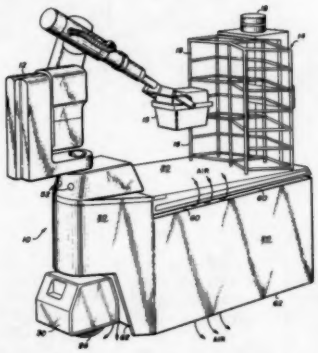
SELF-CONTAINED MOBILE REPROGRAMMABLE AUTOMATION DEVICE

George R. Koch, Los Altos; Michael Krolak, Los Gatos, and Michael R. Biche, Newark, all of Calif., assignors to Flexible Manufacturing Systems, Inc., Los Gatos, Calif.

Filed May 17, 1985, Ser. No. 735,468

Int. Cl.[4] G06F *15/50*

U.S. Cl. 364—478 **8 Claims**



1. A mobile transport unit comprising:

a chassis, adapted for transporting a robot manipulator arm;

a front and rear wheel means, mounted about the chassis whereby the chassis may freely roll thereon, said front wheel means being mounted to a steering assembly mounted to rotate about a vertical axis, said assembly including a drive motor for supplying rotary motion to said front wheel means, said assembly further including a steering notor for rotating said assembly about said vertical axis whereby a heading of said assembly may be changed, said assembly further including a rotary encoder coupled thereto for supplying positional informational of the assembly relative to a predetermined axis of the transport unit, and a distance encoding means for measuring a vehicle travel distance from a predetermined point, said rear wheel means being independently secured to opposing lateral rear portions of the vehicle;

at least one central control computer means, electronically coupled to said rotary encoder, to said distance encoding means and to said drive and said steering motors;

a diffuse infrared communication means, mechanically attached to the unit and electrically coupled to the computer means and in diffuse infrared communication with an extra vehicular information and control source for directing and controlling the unit;

a laser docking and positioning means for locating a predetermined point of the unit relative to a fixed piece of equipment to and from which the vehicle will shuttle; and

a power supply means coupled to said drive and steering motors, and to said control means and mounted within said chassis.

4,698,776

RECORDING/REPRODUCING APPARATUS

Izumi Shibata, Tokyo, Japan, assignor to Kabushiki Kaisha Kenwood, Japan

Filed May 23, 1984, Ser. No. 613,173

Claims priority, application Japan, May 30, 1983, 58-94194; Jul. 12, 1983, 58-125420

Int. Cl.[4] G10L *5/00*

U.S. Cl. 364—513.5 **1 Claim**

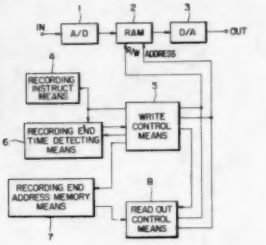
1. Speech recording/reproducing apparatus comprising:

A/D converter means for converting an input analog speech signal into a digital signal;

a read/write semiconductor digital memory for storing the digital signal from said A/D converter means;

D/A converter means for converting digital signal read out from said memory to reproduce the speech signal;

detection means for detecting that the input analog speech signal exists; and



control means in response to the output of said detection means for writing the digital signal into said memory while the input analog speech signal exists until the store capacity of said memory is filled up, and for starting read-out of the digital signal from said memory with detection of the termination of the input analog speech signal.

4,698,777

INDUSTRIAL ROBOT CIRCULAR ARC CONTROL METHOD FOR CONTROLLING THE ANGLE OF A TOOL

Kenichi Toyoda, Hino; Shinsuke Sakakibara, Komae; Tooru Mizuno, and Ryuichi Hara, both of Hino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

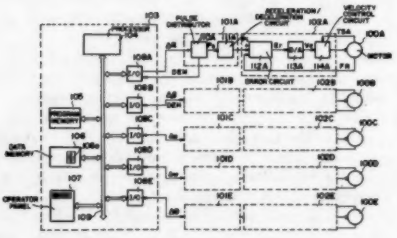
PCT No. PCT/JP84/00268, § 371 Date Jan. 25, 1985, § 102(e) Date Jan. 25, 1985, PCT Pub. No. WO84/04829, PCT Pub. Date Dec. 6, 1984

PCT Filed May 25, 1984, Ser. No. 700,706

Claims priority, application Japan, May 26, 1983, 58-092825

Int. Cl.[4] G05B *19/415;* G06F *15/46*

U.S. Cl. 364—513 **4 Claims**



1. An industrial robot circular arc control method for an industrial robot which possesses a plurality of motion axes along which motion is effected by a plurality of respective motors, and a control unit for controlling each of the motors of the robot, the control unit controlling each of the motors to move a tip of a working member, which is mounted on a wrist of the robot, along a circular arc, said method comprising the steps of:

storing positions of the tip and base of the working member at a predetermined rotational angle of the wrist, with a predetermined point Qt in the plane of the wrist of the robot serving as a reference;

positioning the tip of the working member at each taught point at a predetermined target angle and storing, as taught data, the position of the predetermined point Qt in the plane of the wrist and the rotational angle of the wrist at each taught point;

finding positions of the tip and base of the working member in a robot coordinate system based on said stored taught data and the positions of the tip and base of the working member where the predetermined point Qt in the plane of the working member serves as the reference, and using these positions as plural taught points of the tip and base of the working member;

obtaining corresponding points of the tip and a base of the working member at the plural taught points for circular-arc control of the tip of the working member;

finding interpolated points of the tip of the working member by interpolation from the corresponding points of the tip of the working member;

finding interpolated points of the base of the working member by interpolation from the corresponding points of the base of the working member;

obtaining motion command quantities for the respective motion axes from interpolated points obtained for the tip and the base; and

controlling the motors on the basis of the command quantities.

4,698,778

METHOD OF PROCESSING GRADATION INFORMATION WITH VARIABLE MAGNIFICATION

Masahiro Ito, Kawasaki; Noboru Murayama, Machida; Koichi Suziku, Yokohama; Kei Sato, Yokohama, and Tsutomu Sato, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 31, 1984, Ser. No. 646,503

Claims priority, application Japan, Sep. 2, 1983, 58-161693

Int. Cl.[4] G06F *15/62, 15/66;* H04N *1/04*

U.S. Cl. 364—518 **7 Claims**

1. A method of converting original image data into digital signals for transmission or reproduction, said data consisting of gradation values representing individual picture elements of a picture original, said method comprising the steps of:

scanning the individual picture elements;

determining the gradation values on each picture element;

selecting for each of the gradation values a corresponding digital mother matrix pattern of predetermined size based on a predetermined magnification factor, said corresponding digital mother matrix pattern consisting of an array of digital values representative of the selected gradation value;

selecting for each of the gradation values the appropriate portion of said digital mother matrix pattern, said appropriate portion constituting a child matrix pattern, the size of said appropriate portion being determined by said magnification factor; and

storing the child matrix pattern in a memory for subsequent transmission or reproduction.

4,698,779

GRAPHIC DISPLAY WITH DETERMINATION OF COINCIDENCE OF SUBJECT AND CLIP AREAS

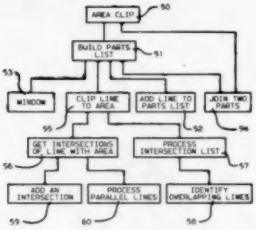
Ian Holden, Winchester, and Michael J. Malings, Whitchurch, both of England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1985, Ser. No. 728,718

Claims priority, application United Kingdom, May 5, 1984, 8411579

Int. Cl.[4] G06F *15/72*; G09G *1/06*

U.S. Cl. 364—520 6 Claims



1. A method of determining the coincidence of a subject area and a clip area, in a graphic display system in which area definitions are stored in a display list store comprising the steps of:

(a) creating and storing a subject area parts list comprising separate entries for each part of one or more contiguous lines of the subject area that do not pass through the clip area

(b) creating and storing a clip area parts list comprising separate entries for each part of one or more contiguous lines of the clip area that pass through the subject area

(c) creating and storing an overlap parts list comprising separate entries for each part of one line of the subject and clip areas that overlap

(d) for each entry in the subject area parts list scanning unprocessed entries first in the subject area parts list secondly in the clip area parts list thirdly in the overlap parts list for any entry having an end point definition the same as on end point definition of the part being processed, creating a new part by joining any part found to the part being processed storing the created part in a results part list and reiterating the process for the entry in the results part list until no further parts are found whereby the results part list includes the definition of the portion of the subject area which does not coincide with the clip area.

4,698,780

METHOD OF MONITORING AN ELEVATOR SYSTEM

Alan F. Mandel, Mt. Lebanon; Kenneth M. Eichler, North Versailles; William J. Trosky, Wilkinsburg, all of Pa., and William H. Moore, Bridgewater, N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 8, 1985, Ser. No. 785,378

Int. Cl.[4] G06F *15/46, 15/14*; B66B *1/00*

U.S. Cl. 364—550 7 Claims

1. A method of monitoring an operating elevator system for a malfunction related to predetermined sequentially performed functions, comprising the steps of:

providing binary logic signals having one of two logic levels from an elevator system which are pertinent to a predetermined sequence of functions to be monitored for a malfunction,

storing unique user defined event starting and stopping conditions which define the start of an event and the end of an event, respectively, in terms of the logic levels of at least certain of said binary logic signals,

detecting when each of said binary logic signals changes logic levels, with each such change being a state change of the event,

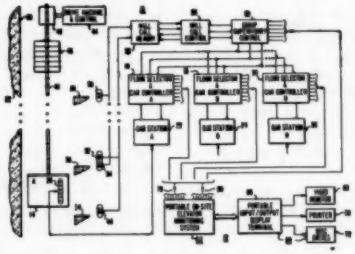
providing a correct binary image of the event by the steps of:

detecting the occurrence of the unique user defined event starting and stopping conditions while the elevator system is operated to correctly perform the sequence to be monitored,

storing the logic levels of all of the binary logic signals upon each state change which occurs between the detection of the unique event starting and stopping conditions,

and timing each event to detect the occurrence time of each state change relative to the start of the event,

and monitoring the operation of the elevator system by providing binary images of said event each time said event occurs, with said monitoring step including the steps of:



detecting the occurrence of the unique user defined event starting and stopping conditions while the elevator system is in operation,

storing the logic levels of all of the binary logic signals upon each state change and timing each event to detect the occurrence time of each state change relative to the start of each event, to provide a temporary binary image of the event,

comparing each temporary binary image with the correct binary image to detect differences,

and storing a temporary image for diagnostic purposes when the comparing step detects a difference between the temporary binary image and the correct binary image.

4,698,781

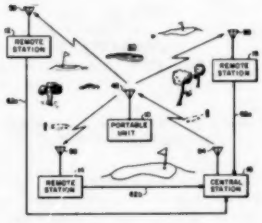
SYSTEMS FOR DETERMINING DISTANCES TO AND LOCATIONS OF FEATURES ON A GOLF COURSE

William C. Cockerell, Jr., Ramona, Calif., assignor to Spymark, Incorporated, Vista, Calif.

Continuation of Ser. No. 519,069, Aug. 1, 1983, abandoned. This application Apr. 9, 1986, Ser. No. 849,703

Int. Cl.[4] G01C *21/00*; G06G *7/78*; G01S *3/02*

U.S. Cl. 364—561 7 Claims



1. A system for determining distances on a golf course, comprising

a portable interrogation unit for being carried on a golf course to encode and transmit an interrogation signal from

any position occupied by a golf ball on the golf course, wherein the interrogation signal includes portable unit identification data and a request pertaining to the distance between the location of the portable interrogation unit and a specified location selected from various predetermined locations on the golf course;

at least three remote stations located at known locations about the golf course to define a triangle encompassing a substantial portion of the golf course, wherein at least one of the remote stations includes

means for receiving the interrogation signal from the portable interrogation unit; and

means responsive to receipt of the interrogation signal for encoding and communicating an interrogation information signal to a central station, wherein the interrogation information signal includes remote station identification data, data pertaining to the location of the source of the interrogation signal relative to the remote station, the portable unit identificatjion data and the request included in the received interrogation signal; and

wherein each of the other remote stations includes

means for receiving the interrogation signal from the portable interrogation unit; and

means responsive to receipt of the interrogation signal for encoding and communicating an interrogation information signal to a central station wherein the interrogation information signal includes remote station identification data and information pertaining to the location of the source of the interrogation signal relative to the remote station; and

a central station including

means for receiving the interrogation information signals from the remote stations;

memory means for storing golf course position information for each of said predetermined locations;

processing means, responsive to said request, for obtaining, from said memory means, position information for said specified location and for, based upon said received interrogation information signals and said obtained position information, determining the distance between the portable interrogation unit and said specified location; and

means responsive to said distance determination and to said received interrogation information signals for encoding and transmitting a response signal addressed to the portable interrogation unit indicated by the portable unit identification data in the received information signals, wherein the response signal indicates the requested distance; and

wherein the portable interrogation unit further includes

means for receiving the response signal addressed to the portable interrogation unit; and

means reponsive to the response signal for displaying an indication of the requested distance.

4,698,782

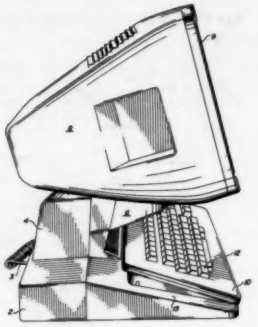
ELECTRONIC WORKSTATION WITH PARKABLE KEYBOARD

Edward C. Ng, San Jose, Calif., and William M. Czsnovsky, Austin, Tex., assignors to Motorola Computer Systems, Inc., Cupertino, Calif.

Filed Aug. 1, 1984, Ser. No. 636,533
Int. Cl.[4] G06F *1/00*; F16M *11/00*
U.S. Cl. 364—708 **12 Claims**

1. In an electronic workstation operated by an operator and comprising a base resting upon a work surface and having an upper surface inclined at an angle towards the operator and having a front edge thereof which is close to the operator, an element having a surface viewed by the operator for conveying information from the workstation to the operator, at least a portion of said element surface being substantially equidistant from the operator as the front edge of the base, and a support for supporting the viewed element relative to the base, the improvement comprising:

a keyboard for use by the operator in communicating with the workstation, the keyboard having a front edge therefor which is close to the operator, the keyboard being of such length and width, relative to the upper surface of the base, as to enable said keyboard to be positioned in contact



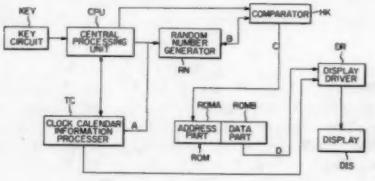
with substantially all of the base upper surface so that the front edge of the keyboard projects upon the base upper surface, thereby minimizing the projection of the keyboard upon the work surface, and the keyboard being of such thickness, relative to the distance between such viewed element and the base upper surface, that operator access to all keys on the keyboard is provided.

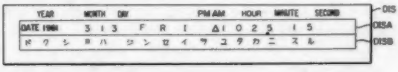
4,698,783

ELECTRONIC EQUIPMENT CALENDAR AND RANDOM DAILY MESSAGE GENERATOR

Yoshiaki Nishimuro, Hachioji; Osamu Hirata, Tokyo; Kuniomi Kano, Yokohama; Akira Miyakawa, Tokyo; Hideo Fushimoto, and Kazumi Sekine, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 674,717, Nov. 26, 1984, abandoned, which is a continuation of Ser. No. 372,553, Apr. 28, 1982, abandoned. This application Aug. 11, 1986, Ser. No. 894,743
Claims priority, application Japan, May 18, 1981, 56-73462
Int. Cl.[4] G04B *47/04*; G04G *15/00*
U.S. Cl. 364—710 **10 Claims**





1. Electronic equipment, comprising: means for processing time information and generating an output at the beginning of each occurrence of a first predetermined time period;

storage means for fixedly storing a plurality of messages;

means coupled to said storage means for displaying messages

stored in said storage means and for displaying time information;

first control means responsive to the output from said time information processing means for randomly selecting one of the messages stored in said storage means at the beginning of each said first time period and providing the selected one of the messages to said display means for display, the selected message being displayed by said display means in association with displayed time information; and

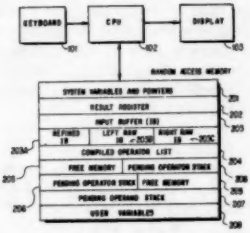
second control means for preventing the same message from being selected more than once by said first control means within a second predetermined time period that is longer than said first time period, wherein said second control means includes means for storing data representative of the messages which have been displayed by said display means, and erases all of the stored data at the beginning of each second time period.

4,698,784

SYNTACTIC DEVICE FOR CHAIN CALCULATIONS

Steven T. Abell, Corvallis, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 6, 1984, Ser. No. 568,669
Int. Cl.[4] G06F *7/00*
U.S. Cl. 364—900 **7 Claims**



1. In a computing system capable of calculating chain calculations wherein a final result of a first arithmetic expression may be dependent upon a previous result of a last calculated arithmetic expression, an apparatus comprising:

storage means for storing the previous result of the last calculated arithmetic expression;

first means for entering the first arithmetic expression;

second means for verifying a syntactic correctness of the first arithmetic expression entered by the first means, wherein the second means is able to detect a first location in the first arithmetic expression where according to the syntax there should have been a variable, but the variable is absent;

third means for computing the final result;

said third means further comprising interpreting means for replacing the absent variable at the first location with the previous result of the last calculated arithmetic expression transferred from the storage means to compute the final result;

fourth means for displaying the final result computed by the third means; and

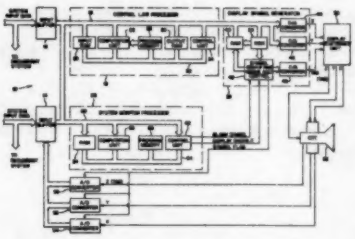
fifth means for transferring the final result to the storage means, wherein the final result will then be the previous result of a next arithmetic expression.

4,698,785

METHOD AND APPARATUS FOR DETECTING CONTROL SYSTEM DATA PROCESSING ERRORS

John P. Desmond, 1954 SE. Quail Cir.; Douglas W. Ford, 283 NE. 34th Pl., both of Hillsboro, Oreg. 97124; Michael E. Fossey, 2320 22nd Ave., Forest Grove, Oreg. 97116; Michael Stanbro, 7850 SW. Hemlock, Tigard, Oreg. 97223, and Kenneth A. Zimmerman, 6187 SW. 164th Pl., Beaverton, Oreg. 97007

Filed Dec. 2, 1983, Ser. No. 557,631
Int. Cl.[4] G06F *11/16*
U.S. Cl. 364—900 **27 Claims**



1. An information processing system, comprising:

first digital processing means for receiving input information and for processing the input information in accordance with a first operational function to develop output information, the first operational function being implemented in a first of information processing algorithms;

second digital means receiving the output information from thefirst digital processing means for computing a derived version of the input information in accordance with a second operational function, the second operational function being implemented in a second set of information processing algorithms which differs from the first set of information processing algorithms; and

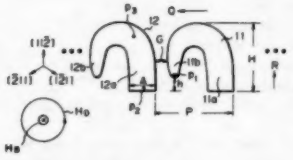
comparison means for comparing the actual input information with the drived version of the input information to determine whether they differ within a preassigned operational tolerance.

4,698,786

MAGNETIC BUBBLE MEMORY DEVICE

Masashi Amatsu; Takeyasu Yanase; Hiroshi Inoue, all of Yokohama, and Yusuke Nakagawa, Machida, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 28, 1985, Ser. No. 706,611
Claims priority, application Japan, Mar. 3, 1984, 59-39740
Int. Cl.[4] G11C *19/08*
U.S. Cl. 365—39 **11 Claims**



1. A magnetic bubble memory device comprising:

a magnetic layer in which magnetic bubbles can be moved;

a bubble propagation path defined by a repeated pattern of magnetically soft pattern elements of predetermined period P, each of the pattern elements being of height H and

having an asymmetrically crooked or curved shape with an entrance-side segment and an exit-side segment of different lengths in the direction of said height, said pattern elements being arranged on the surface of said magnetic layer at said predetermined period P in a direction traverse to the direction of said height of said segments in such a manner that the exit-side segment of one of the adjacent pattern elements is opposed to the outer side of the entrance-side segment of the other pattern element, with a gap therebetween, the difference h in said lengths of said entrance-side and exit-side segments of each pattern element being in the range of from 10% to 25% of the height H of the pattern element;

trap positions along said bubble propagation path, the direction of bubble propagation along the bubble propagation path being perpendicular to an easy axis of magnetization in the magnetic layer; and

a hold field for stably holding the bubble in each said trap position in the bubble propagation path being applied to the pattern in the same direction as that of said easy axis of magnetization.

4,698,787

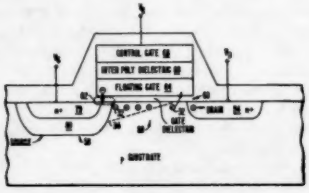
SINGLE TRANSISTOR ELECTRICALLY PROGRAMMABLE MEMORY DEVICE AND METHOD

Satyen Mukherjee, San Jose, and Thomas Chang, Santa Clara, both of Calif., assignors to Exel Microelectronics, Inc., San Jose, Calif.

Filed Nov. 21, 1984, Ser. No. 673,946

Int. Cl.[4] G11C *11/34*

U.S. Cl. 365—185 **17 Claims**



1. An electrically erasable memory device having a plurality of storage sites, a plurality of row address lines, a plurality of column address lines, and a plurality of erase lines, wherein each combination of one of the plurality of row address lines and one of the plurality of column address lines define a different one of the plurality of storage sites, and further wherein each of the plurality of storage sites comprises a single transistor including

a source coupled to an associated one of the plurality of erase lines;

a drain coupled to an associated one of the plurality of column address lines;

a control gate coupled to an associated one of the plurality of row address lines; and

a floating gate positioned between the gate and the source and drain; and further including

means for injecting hot electrons onto the floating gate when the associated ones of the column address and row address lines are raised to a first predetermined potential above that of the associated one of the erase line; and

means for inducing Fowler-Nordheim tunneling of electrons from the floating gate to the source when the associated erase line is raised to a second predetermined potential above the associated row address line.

4,698,788

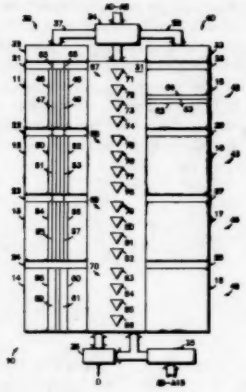
MEMORY ARCHITECTURE WITH SUB-ARRAYS

Stephen T. Flannagan; Paul A. Reed, and John Barnes, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 1, 1985, Ser. No. 750,637

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—205 **9 Claims**



1. A static random access memory responsive to column and row address signals, comprising:

a plurality of sub-arrays arranged in a plurality of rows and at least first and second columns, each sub-array having word lines running the length of the sub-array in a top to bottom direction, having bit line pairs running the width of the sub-array in a left to right direction, and having a word line driver for enabling a selected word line in response to receiving a row select signal corresponding to the selected word line;

a global row decoder for providing the row select signals as determined bh row address signals;

a plurality of column decoders for performing a decode of data provided on the bit lines of the first and second columns of sub-arrays, each column decoder corresponding to a particular sub-array; and

a plurlaity of sense amplifiers for sensing the output of the column decoders;

characterized in that:

the memory has a top side, bottom side, a left side, and a right side;

the rows of sub-arrays run from left to right, and are sequentially arranged from top to bottom, with a first row of sub-arrays being nearest the top side;

the columns of sub-arrays running from top to bottom, and sequentially arranged from left to right, with the first column of sub-arrays being nearest the left side; and

the plurality of sense amplifiers comprises sets of amplifiers, wherein one set of amplifiers is located in each row between said first and second columns.

4,698,789

MOS SEMICONDUCTOR DEVICE

Tetsuya Iizuka, Funabashi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 21, 1985, Ser. No. 800,301

Claims priority, application Japan, Nov. 30, 1984, 59-253003; Nov. 30, 1984, 59-253004

Int. Cl.[4] G11C *11/40*

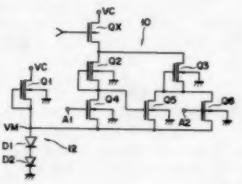
U.S. Cl. 365—226 **12 Claims**

1. An MOS semiconductor device comprising:

first and second power source terminals connected to re-

ceive a power source voltage and a reference voltage, respectively;

an MOS circuit including a plurality of MOS transistor whose back gates are coupled with said first or second power source terminal, and having first and second operation voltage receiving terminals, one of said first and second operation voltage receiving terminals being coupled with the one of said first and second power source terminals not coupled with said back gates; and



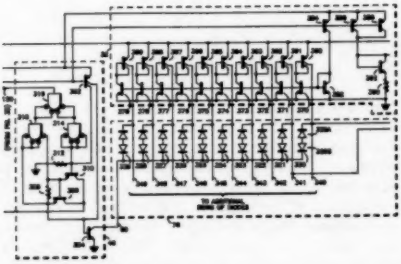
an operation voltage setting circuit having voltage-drop means coupled between said second power source terminal and the one of the first and second operation voltage receivig terminals of said MOS circuit not coupled with said back gates for developing a voltage drop across said voltage-drop means in accordance with an operation current flowing through said MOS circuit and said voltage-drop means, and applying to said MOS circuit a voltage corresponding to a difference between the voltage drop across said voltage-drop means and said power source voltage.

4,698,790

PROGRAMMABLE READ ONLY MEMORY ADAPTIVE ROW DRIVER CIRCUIT

Walter L. Davis, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 9, 1985, Ser. No. 753,083
Int. Cl.[4] G11C *8/00, 17/06*
U.S. Cl. 365—230 **3 Claims**



1. A low voltage memory circuit operable in selectable read and program modes and powerable in said read mode by a one cell battery, said memory comprising in combination:

a plurality of memory elements connected to a common row conductor;

a first bipolar transitor of a first type wherein the collector of said first transistor is connected to said row conductor and the emitter of said first transistor is connected to a first power supply terminal;

a second bipolar transistor of an opposite type and having dual collectors, wherein the emitter of said second transistor is coupled to a second power supply terminal, a first collector of said second transistor is connected to the base of said first transistor, and a second collector of said second transistor and the base of said first transistor, whereby, in said read mode, a first bias voltage is applied to the base of said second transistor, thereby providing said first transistor with a first current capability;

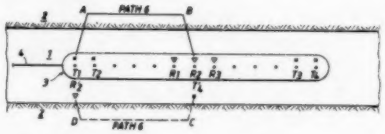
whereby, said memory circuit is operable in said read mode when the voltage across said first and second power supply terminals is as low as 1.0 Volt.

4,698,791

ACOUSTIC WELL LOGGING METHOD FOR IMPROVED AMPLITUDE DATA ACQUISITION

Allen B. Cunningham, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Jun. 17, 1986, Ser. No. 875,144
Int. Cl.[4] G01V *1/40*
U.S. Cl. 367—25 **13 Claims**



1. An acoustic well logging method, employing a tool having a longitudinal axis and including a set of at least four acoustic transducers spaced from each other along the axis, where at least two of the transducers are of the transmitting kind and at least two are of the receiving kind, and where a midpoint transducer is positioned along the axis substantially midway between a pair of spanning transducers, and a non-midpoint transducer is positioned between the spanning transducers, where each pair including one of the spanning transducers and the midpoint transducer is a transmitter-receiver pair, and each pair including one of the spanning transducers and the non-midpoint transducer is a transmitter-receiver pair, including the steps of:

(a) when the tool is in a first position in the well, recording a first acoustic signal associated with a transmitter-receiver pair including the midpoint transducer and a first spanning transducer;

(b) when the tool is at approximately the first position, recording a second acoustic signal associated with a transmitter-receiver pair including the non-midpoint transducer;

(c) when the tool is in a second position in the well in which the midpoint transducer occupies substantially the same point along the longitudinal axis of the well as did one spanning transducer when the tool was in the first position, recording a third acoustic signal associated with a transmitter-receiver pair including the midpoint transducer and the spanning transducer other than the first spanning transducer; and

(d) when the tool is approximately in the second position, recording fourth acoustic signal associated with a transmitter-receiver pair including the non-midpoint transducer.

4,698,792

METHOD AND APPARATUS FOR ACOUSTIC DIPOLE SHEAR WAVE WELL LOGGING

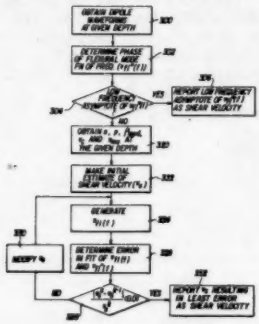
Andrew L. Kurkjian, Bethel, and Shu-Kong Chang, West Redding, both of Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Dec. 28, 1984, Ser. No. 687,075
Int. Cl.[4] G01V *1/14, 1/40*
U.S. Cl. 367—31 **10 Claims**

2. An apparatus for determining the shear velocity of a formation traversed by a fluid-filled borehole, comprising:

means for obtaining a plurality of waveforms from a dipole acoustic investigation of the formation relative to a common location in the borehole;

means for determining from said waveforms a flexural mode phase velocity as a function of frequency;
means for selecting an estimated shear velocity;
means for theoretically determining a flexural mode phase velocity as a function of frequency, from said estimated shear velocity;
means for fitting said theoretically determined flexural mode



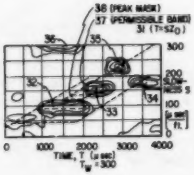
phase velocity to said waveform-determined flexural mode phase velocity;
means for iteratively actuating said selecting means, theoretically determining means, and fitting means for additional estimated shear velocities until a least error fit is identified; and
means for reporting the last-estimated shear velocity as the shear velocity of the formation.

4,698,793

METHODS FOR PROCESSING SONIC DATA

Peter Wu, Houston, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed May 23, 1984, Ser. No. 612,964
Int. Cl.[4] G01V 1/21
U.S. Cl. 367—32 **9 Claims**



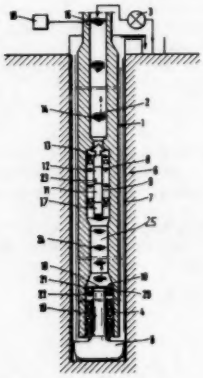
1. A method of sonic logging comprising the steps of:
establishing at a depth of interest in a borehole a set of peak matrices comprised of peak vectors representative of a plurality of different characteristics of sonic signals traversing an earth formation,
establishing a set of rules based upon borehole sonic characteristics and including the utilization of past histories of slowness and coherence values of wave components of interest,
searching said matrices in accordance with said rules to identify the presence in said sonic signals of wave components of interest,
recording those identified wave components as a function of the depth of interest, and
repeating said steps at each depth of interest; in which said peak vectors include the characteristics of the maximum of peak coherence and the energy associated with the maximum of peak coherence for each wave component and the wave components include a compressional component, a shear wave component a casing peak and a Stoneley wave compohent;
and further in which a casing peak is identified by counting over a given number of waveform sets the number of peaks with slowness within a given slowness range and whose arrival times are within a predetermined amount of the integrated casing time and having a coherence value greater than a given coherence cut, upon counting more than one peak, searching for the peak within the given casing slowness range having the maximum coherence value and identifying it as the casing peak.

4,698,794

DEVICE FOR REMOTE TRANSMISSION OF INFORMATION

Volker Kruger, Celle, and Ulrich Hense, Hambühren, both of Fed. Rep. of Germany, assignors to Eastman Christensen, Salt Lake City, Utah

Filed Jul. 22, 1985, Ser. No. 757,711
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1984, 3428931
Int. Cl.[4] H04H 9/00
U.S. Cl. 367—83 **7 Claims**



1. In a device for transmitting information from an underground borehole to the surface during drilling of the borehole comprising an information transmitting assembly mounted in a portion of a drill housing situated a remote distance from a drill bit and the surface including power supply means, at least one detector means for detecting a variable and providing information as a function of said variable, a processor connected to the detector means for converting said information from said detector means into electrical control signals and a transducer for generating in a drilling fluid forced through said drill housing a frequency spectrum of pressure pulses propagated toward and processed at the surface as a function of said electrical control signals, the improvement comprising:
at least one remote detector means situated at a position in the drill housing and borehole remote from said processor, said remote detector means being separated from said processor by a wire-less transmission path having first and second ends and being provided with a signal transmitter, associated with the remote detector means, at the first end of said transmission path for transmitting information from the remote detector at a different frequency spectrum than that of the transducer and a signal receiver at the second end of said transmission path connected to provide information detected by the remote detector to the processor for transmission to the surface by the trans-

ducer and in which the frequency spectrum emitted by the signal transmitter is different from that of the transducer which generates pressure pulses in said drilling fluid.

4,698,795

TRACKING SERVO DEVICE

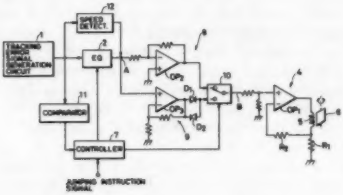
Junichi Yoshio, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 13, 1985, Ser. No. 744,436

Claims priority, application Japan, Jun. 13, 1984, 59-121088

Int. Cl.[4] G11B *7/095*

U.S. Cl. 369—44 **6 Claims**



1. A tracking servo device for controlling a relative position in the radial direction of a disc-shaped recording medium between an information reading point of a pick-up and a recording track on said medium in response to a tracking error signal produced in accordance with an offset of said relative position, said tracking servo device comprising:

means for detecting when said tracking error signal exceeds a reference level;

means for producing first and second error signals, said first and second error signals following in waveshape said tracking error signal and being respectively in-phase with and 180° out of phase with said tracking error signal;

means for alternately selecting one of said first and second error signals; and

means for controlling said selecting means in response to an output of said detector means in a jumping operation, whereby a jumping operation over said recording track by said information reading point is controlled in response to an output signal of said selecting means.

4,698,796

DISK RECORDING AND/OR REPRODUCING APPARATUS WITH COMPENSATION FOR EXTRANEOUS FORCE DURING TRACK JUMP

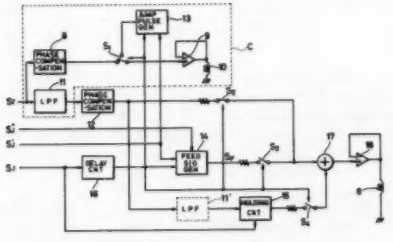
Shuichi Kimura, Saitama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 21, 1984, Ser. No. 642,950

Claims priority, application Japan, Aug. 22, 1983, 58-152921

Int. Cl.[4] G11B *21/08, 7/095*

U.S. Cl. 369—44 **5 Claims**



1. A disk recording and/or reproducing apparatus for moving one of a rotating disk and a pickup relative to the other in a radial direction of the disc, said apparatus being inclined at an angle with respect to the horizontal so that a bias force tends to cause relative movement of the disk and pickup relative to each other in the radial direction of the disk; said apparatus comprising a linear motor, a first circuit for extracting a low-frequency component of a tracking error signal, a second circuit for holding the low-frequency component, and switching means for supplying a value held in said second circuit to said linear motor during a track jump, said value substantially counteracting said bias force during said track jump.

4,698,797

OPTICAL TYPE INFORMATION REPRODUCING DEVICE

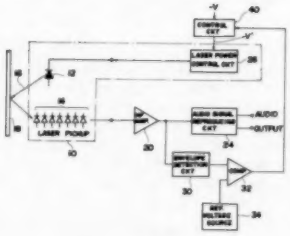
Hirotake Komatsu, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed May 15, 1985, Ser. No. 734,566

Claims priority, application Japan, May 22, 1984, 59-103007

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—116 **6 Claims**



1. An optical type information reproducing device for optically reproducing information recorded on a disc, comprising:

a laser beam source for projecting a reproducing laser beam on said disc;

a pickup and signal processing circuit for receiving the laser beam projected by said laser beam source via said disc, performing photoelectric conversion and signal processings with respect to the received laser beam and outputting a reproduced signal;

a laser beam source control circuit responsive to the level of the laser beam received by said pickup and signal processing circuit for controlling the level of the reproducing laser beam projected on said disc from said laser beam source so as to maintain the level of the laser beam received by said pickup and signal processing circuit at a constant value; and

a laser beam source output detector for detecting the level of the laser beam being projected on said disc from said laser beam source,

said laser beam source control circuit being further controlled by the detection output of said laser beam source output detector so as to limit the level of the laser beam being projected on said disc to a maximum value.

4,698,798

DEVICE FOR TRANSLATING A SLIDE

Johannes W. Faber, Eindhoven, Netherlands, and Peter J. M. Janssen, Colorado Springs, Colo., assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 20, 1985, Ser. No. 800,013

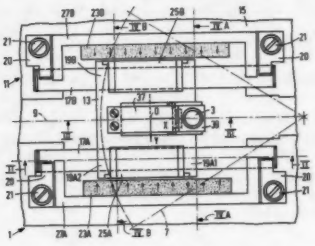
Claims priority, application Netherlands, Jul. 11, 1985, 8501991

Int. Cl.[4] G11B *3/36*

U.S. Cl. 369—219 **5 Claims**

1. A device for translating a slide, which device comprises a frame and a rectilinear guide means for the slide, which rectilinear guide means comprises mutually parallel first and second

guide rods and first bearing means and second bearing means which cooperate with the guide rods to guide the slide relative to the frame in a rectilinear path along a first axis of an orthogonal triaxial system comprising said first axis and two further axes perpendicular thereto, characterized in that the first bearing means comprises a first bearing sleeve and a second bearing sleeve through which the first guide rod extends in such a way that the first guide rod and the first bearing sleeve support the



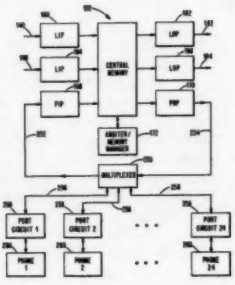
slide against movement along said two further axes and the first guide rod and the second bearing sleeve support said slide against movement only along one of said two further axes of the orthogonal triaxial system and the second bearing means comprises a first bearing sleeve through which the second guide rod extends in such a way that the second guide rod and the first bearing sleeve of said second bearing means support the slide against movement along said two further axes.

4,698,799

LINK SWITCH FOR A BURST-SWITCHING COMMUNICATIONS SYSTEM

Stanford R. Amstutz, Andover; Mark Eliscu, Needham, and E. Fletcher Haselton, Waltham, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 2, 1985, Ser. No. 762,641
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—58 **36 Claims**



1. A link switch for a burst-switching communications system, a burst being a plurality of bytes including a destination-port address, an information portion, and a termination portion at the end of the burst, said system including a plurality of switches interconnected by time-divided communications links, each link having a plurality of frames within each second of time, each frame having a plurality of channels, each channel having communications capacity for the transmission of one byte, a byte being a predetermined number of bits, a bit being one binary digit, said link switch comprising:

(a) a central memory;

(b) link-input processing means coupled with said central memory, said link-input processing means having means for coupling with a communications link, means for receiving bursts on said communications link, and means for accessing said central memory;

(c) link-output processing means coupled with said central memory, said link-output processing means having means for coupling with a communications link, means for transmitting bursts on said communications link, and means for accessing said central memory;

(d) at least one port, each port providing means for coupling with a control processor, an end-user instrument, or another communications system, said coupling being made via a port-interface circuit;

(e) port-input processing means coupled between said central memory and at least one of said ports, said port-input processing means having means for receiving bursts from said port(s) and means for accessing said central memory;

(f) port-output processing means coupled between said central memory and at least one of said ports, said port-output processing means having means for transmitting bursts to said port(s) and means for accessing said central memory;

(g) memory-management means coupled with said central memory for insuring that at any given time only a single access to said central memory may occur;

(h) means for routing a burst through said switch, said routing means having processing capacity sufficient to support an effective transmission rate of at least 1.544 million information-bearing bits per second on each of said communications links coupled with said link switch, said routing means including:

(i) means for routing a burst through said switch from an origin port of said switch to a destination port of said same switch;

(ii) means for routing a burst through said switch from an origin port of said switch to a link of said switch leading toward the destination port;

(iii) means for routing a burst through said switch from a link leading into said switch to a destination port of said switch; and

(iv) means for routing a burst through said switch from a link leading into said switch to a link of said switch leading toward the destination port; and

(i) means for routing from port to link and from link to link employing dynamic allocation of bursts to channels within links such that any channel is allocated only when a burst is being transmitted therein and said channel is otherwise available for transmission of another burst, said switch after receiving the first byte of a burst and also determining that said burst will be transmitted on a link of said switch leading toward the destination port then transmitting said first byte in the first available channel of a first frame of said link leading toward said destination port and assigning said channel to said burst, said switch after receiving the second or a successive byte of said burst then transmitting said second or successive byte in said assigned channel of the second or successive frame of said link, said switch after transmitting the last byte of said burst then releasing said assigned channel for possible allocation to another burst in the frame immediately following the transmission of the last byte of said burst.

4,698,800

BI-DIRECTIONAL TRANSCEIVER CIRCUIT

Joseph R. Cavaliere, Hopewell Junction; Albert Y. Chang, Poughkeepsie, and Rocco J. Robortaccio, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1985, Ser. No. 792,267
Int. Cl.[4] H04B *9/00*
U.S. Cl. 370—24 **6 Claims**

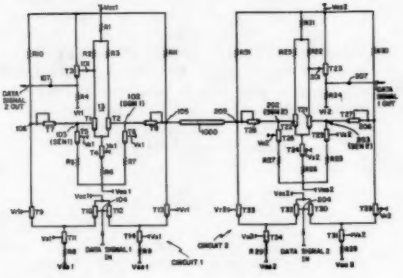
1. A simultaneous bi-directional transceiver comprises two circuits connected to opposite ends of a signal transmission line, each of the circuits comprising:

a differential amplifier having first and second inputs and an output,

a first constant current sink connected to the first input of said differential amplifier,

a first diode connected at one end to the first input of said differential amplifier,

the other end of the first diode being connected to one end of a first impedance means and a source of input signals, and to one end of the signal transmission line, the other end of the first impedance means being connected to a source of voltage,



a second constant current sink connected to the second input of said differential amplifier,

a second diode connected at one end to the second input of said differential amplifier,

the other end of the second diode being connected to one end of a second impedance means and the source of input signals, the other end of the second impedance means being connected to the source of voltage.

4,698,801

DIGITAL EXCHANGE SYSTEM

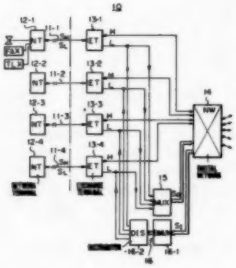
Takashi Hatano, Machida; Takashi Nara, Yokohama; Yutaka Kawato, Tokyo, and Sumie Okada, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 27, 1984, Ser. No. 686,675

Claims priority, application Japan, Dec. 29, 1983, 58-247703

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58 **13 Claims**



1. A digital exchange system comprising:

transmmission lines;

network terminations;

a plurality of subscriber terminal equipment;

a plurality of exchange terminals connected, via respective ones of said transmission lines and said network terminations, with subscriber terminal equipment;

a digital network means for switching between respective ones of said subscriber equipment and for switching only first channel signals having high bit rate; and

a bit-rate conversion means, operatively connected between said digital network means and said exchange terminals, for matching the bit rate of second channel signals comprising packets and having a low bit rate with said high bit-rate channel signals, both of said first channel signals and said second channel signals being transferred, respectively, in a high bit-rate channel and a low bit-rate channel over each of said transmission lines,

said first channel signals comprising M (M is a positive integer) kbit/s signals, communciated directly to and from said digital network,

said second channel signals comprising N (N is a positive integer and M>N) kbit/s packet signals, communciated to and from said digital network by way of said bit-rate conversion means, the bit rate conversion including mulitplex means and demultiplex means,

said multiplex means multiplexs up to [M/N] first channel signals to obtain multiplxed low bit-rate channel signals for transmission to said digital network,

said demultiplex means demultiplexs up to [M/N] multiplexed first channel signals and distributing the demultiplexed signals to corresponding exchange terminals.

4,698,802

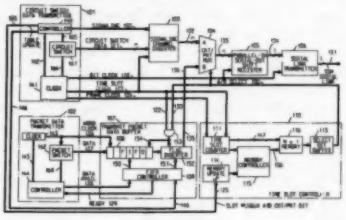
COMBINED CIRCUIT AND PACKET SWITCHING SYSTEM

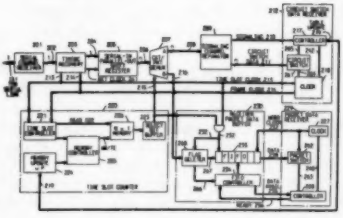
Louis R. Goke, Austin, Tex., and Gary J. Grimes, Thornton, Colo., assignors to American Telephone and Telegraph Company and AT&T Information Systems Inc., Holmdel, N.J.

Filed Mar. 7, 1986, Ser. No. 837,473

Int. Cl.[4] H04Q *11/04; 3/02, 3/24*

U.S. Cl. 370—60 **23 Claims**





1. Apparatus for transmitting a first and a second type of information over a time slot driven bus, characterized in that said apparatus comprises:

a memory having a location individual to each time slot on said bus,

means for writing an indication in each memory location specifying whether the time slot individual to each said location is currently assigned to serve said first or second type of information, and

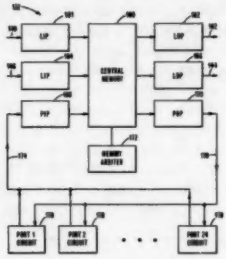
means responsive to each occurrence of each of said time slots on said bus for inserting into said each said time slot the type of information specified by the current contents of the memory location individual to each said time slot.

4,698,803

BURST-SWITCHING COMMUNICATIONS SYSTEM

E. Fletcher Haselton, Waltham; Stanford R. Amstutz, Andover, and Joseph M. Lenart, Arlington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 2, 1985, Ser. No. 762,593
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—60 **78 Claims**



1. A burst-switching communications system comprising:

(a) at least one hub switch;

(b) at least one link switch;

(c) at least one communications link, there being one such link between any two of said switches which have the ability to communicate with each other without the communication passing through an intermediary switch, each link being time-divided with a plurality of frames within each second of time, each frame having a plurality of channels, each channel having communications capacity for the transmission of one byte, a byte being a predetermined number of bits, a bit being one binary digit;

(d) a plurality of ports, each port being a component of one of said switches, each port providing means for coupling with a control processor, an end-user instrument, or another communications system, said coupling being made via a port-interface circuit;

(e) means for routing a burst through said system from an origin port to a destination port, a burst being a plurality of bytes including a destination-port address, an information portion, and a termination portion at the end of the burst, said routing means having processing capacity sufficient to support an effective transmission rate of at least 1.544 million information-bearing bits per second on each of said communications links, said routing means including:

(i) means for routing a burst through a switch from an origin port of said switch to a destination port of said same switch;

(ii) means for routing a burst through a switch from an origin port of said switch to a link of said switch leading toward the destination port;

(iii) means for routing a burst through a switch from a link leading into said switch to a destination port of said switch; and

(iv) means for routing a burst through a switch from a link leading into said switch to a link of said switch leading toward the destination port;

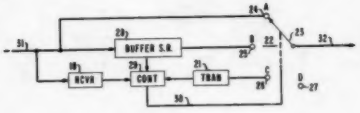
(f) said means for routing from port to link and from link to link employing dynamic allocation of bursts to channels within links such that any channel is allocated only when a burst is being transmitted therein and said channel is otherwise avaiable for transmission of another burst, each switch in turn along a route after receiving the first byte of a burst and also determining that said burst will be transmited on a link of said switch leading toward the destination port then transmitting said first byte in the first available channel of a first frame of said link leading toward said destination port and assigning said channel to said burst, each switch in turn along said route after receiving the second or a successive byte of said burst then transmitting said second or successive byte in said assigned channel of the second or successive frame of said link, each switch in turn along said route after transmitting the last byte of said burst then releasing said assigned channel for possible allocation to another burst in the frame immediately following the transmission of the last byte of said burst.

4,698,804

SHARED DATA TRANSMISSION SYSTEM

Christopher Flores, Redbank, and Bhaskarpillai Gopinath, Berkeley Heights, both of N.J., assignors to Telephone and Telegraph Company, AT&T Bell Labs, Murray Hill, N.J.

Filed Jan. 22, 1985, Ser. No. 693,512
Int. Cl.[4] H04J *3/08, 3/24*
U.S. Cl. 370—86 **1 Claim**



1. A common line transmission system comprising

a plurality of stations connected by a common transmission medium,

means at each of said stations for launching messages on said medium, each said message including a header identifying the source and destination of said message,

means at each of said stations for disconnecting a transmitting side of said station from said medium during message reception,

means at each of said stations for aborting a partial message in the process of being transmitted in response to the reception of another message at said station, and

means for transmitting, at a later time, the aborted portion only of said partial message together with a header identifying the source and destination of said aborted portion.

4,698,805

CONSOLE INTERFACE FOR A TRUNKED RADIO SYSTEM

Michael D. Sasuta, Palatine; Lewis H. Rosenthal, Buffalo Grove; Donald C. Mills, Glenview; Russell A. Marten, Schaumburg; David J. Kizior, Hoffman Estates; Arun Sobti, Wheaton, all of Ill., and Johnny E. Blankenship, Parker, Colo., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 13, 1985, Ser. No. 775,908
Int. Cl.[4] H04B *3/36, 7/14*
U.S. Cl. 370—97 **10 Claims**

1. An improved trunked communication system, comprising in combination:

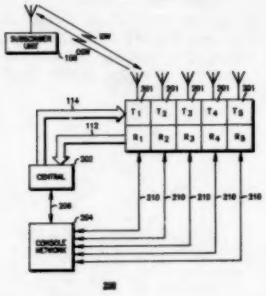
a plurality of trunked repeaters each capable of operating as a voice channel in a first mode, and at least one of which operates as a control channel in a second mode;

a plurality of subscriber units each capable of operating on a discrete number of frequencies;

a central controller for controlling said trunked repeater in response to inbound signalling words, and controlling said plurality of subscriber units via outbound signailing words;

at least one console interface, coupled to a dispatcher console, said interface constructed and arranged to operate within a console network for providing communications between said console and any of said plurality of sub-

scriber units via an assigned trunked repeater, and for transceiving channel call information; and



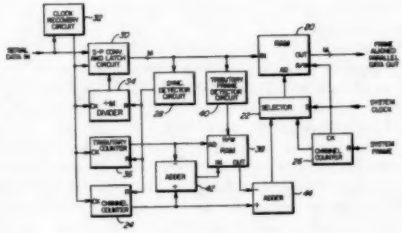
means for interfacing said console network to said central controller to provide console interaction of the trunking system.

4,698,806

FRAME ALIGNMENT OF TRIBUTARIES OF A T.D.M. BIT STREAM

Alan F. Graves, Sherwood Park, and Paul A. Littlewood, Edmonton, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jan. 24, 1986, Ser. No. 821,931
Int. Cl.[4] H04J *3/06*
U.S. Cl. 370—100 8 Claims



1. A method of aligning t.d.m. frames of a plurality of byte-interleaved tributaries which are multiplexed together with arbitrary relative frame phases in t.d.m. frames each including a frame synchronizing word, each tributary including a frame synchronizing byte which includes frame synchronizing information for the tributary, comprising the steps of:

for each tributary, determining an offset of the frame synchronizing byte of the tributary relative to the frame synchronizing word; and

storing each byte of each tributary in a memory at an address determined by the position of the byte in the t.d.m. frame modified by the offset for the tributary;

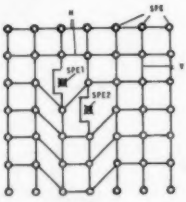
whereby the bytes can be read sequentially from the memory with the tributary t.d.m. frames aligned.

4,698,807

SELF REPAIR LARGE SCALE INTEGRATED CIRCUIT

Warren Marwood, Fairview Park, and Allen P. Clarke, Medindie Gardens, both of Australia, assignors to The Commonwealth of Australia, Canberra, Australia

PCT No. PCT/AU84/00053, § 371 Date Dec. 11, 1984, § 102(e) Date Dec. 11, 1984, PCT Pub. No. WO84/04225, PCT Pub. Date Oct. 25, 1984
PCT Filed Apr. 9, 1984, Ser. No. 691,191
Claims priority, application Australia, Apr. 11, 1983, PF8826
Int. Cl.[4] G06F *11/16*
U.S. Cl. 371—11 9 Claims



1. A method of self repair of large scale integrated circuit modules (LSI or VLSI) comprising the steps of:

arranging a set of systolic processing elements, SPE's, in rows orthogonal to each other,

forming sequential paths between SPEs biased so that normally a data path of the data being processed follows the rows,

establishing which, among the SPE's of a row, are non-functioning SPE's by causing each non-functioning SPE to be flagged by the SPE itself as a result of a comparison of a reference value with an SPE result,

bypassing any such non-functonal SPE by directing the data path from such SPE by triggering diversion of the data to a near SPE in another row, and

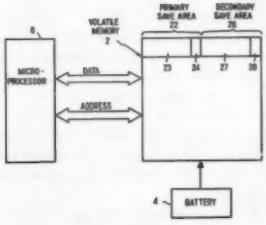
directing the data path from said near SPE back toward the original row to establish and maintain the desired path betwee functional SPE's.

4,698,808

METHOD FOR DETECTING INTERMITTENT ERROR IN VOLATILE MEMORY

Takashi Ishii, Yamato, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 5, 1985, Ser. No. 806,076
Claims priority, application Japan, Dec. 14, 1984, 59-263157
Int. Cl.[4] G06F *11/16*
U.S. Cl. 371—21 8 Claims



1. A method for checking data loss in a battery backed volatile memory to distinguish between geometrically uniform data loss resulting from power decay throughout said memory

and geometrically random data loss resulting from another cause, comprising the steps of,

processing data stored in two separate save areas in said volatile memory to determine whether the data in one said area is correct, and the data in the other said area incorrect or whether the data in both of said areas is incorrect,

whereby an isolated malfunction, signified by said incorrect data in one but not both of said areas can be distinguished from a permanent error due to discharge of said battery, and

recovering from said data loss by copying said correct data into said area containing said incorrect data.

4,698,809

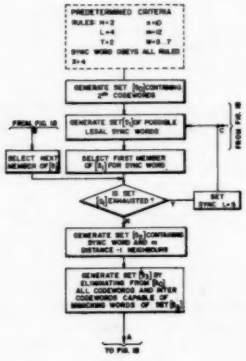
METHOD AND APPARATUS FOR THE CHANNELIZED SERIAL TRANSMISSION OF REDUNDANTLY ENCODED BINARY DATA

Ernst A. Munter, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 31, 1986, Ser. No. 846,440

Int. Cl.[4] G06F *11/00*; H04L *25/49*

U.S. Cl. 371—30 **21 Claims**


PREDETERMINED CRITERIA
RULES: N=2 n=10
L=4 m=12
T=2 W=0, 7
SYNC WORD OBEYS ALL RULES
X=0
GENERATE SET [S0] CONTAINING 2^n CODEWORDS
FROM FIG. 1B
GENERATE SET [S1] OF POSSIBLE LEGAL SYNC WORDS
C
FROM FIG. 1B
SELECT NEXT MEMBER OF [S1]
SELECT FIRST MEMBER OF [S1] FOR SYNC WORD
IS SET [S1] EXHAUSTED ?
Y
SET SYNC L=3
GENERATE SET [S2] CONTAINING SYNC WORD AND m DISTANCE -1 NEIGHBOURS
GENERATE SET [S3] BY ELIMINATING FROM [S2] ALL CODEWORDS AND INTER CODEWORDS CAPABLE OF MIMICKING WORDS OF SET [S1]
A
TO FIG. 1B

1. A method of redundantly encoding a set of 2^n binary words into 2^m binary words, wherein m is greater than n and comprising the steps of:

selecting from the set of 2^m words, a first subset of words meeting predetermined criteria for intra code run-length;

from the first subset of words, selecting a second subset of words comprising one word for use as a synchronization word and its m distance-one neighbors;

generating a third subset of words by eliminating from the first subset of words, the words from the second subset as well as all m code words which could produce a non-aligned code word from the second set across channel boundaries; and

for each of the 2^n binary words, selecting a corresponding word from the third subset of words to form a fourth subset of words, the fourth subset of words being adapted to the transmission of serial binary data exhibiting a statistically distributed DC balance and a maximization of inherent clock information.

4,698,810

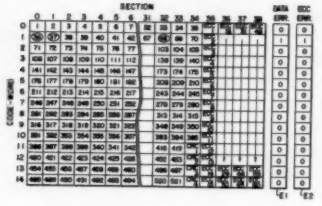
DATA RECORDING AND REPRODUCING SYSTEM WITH ERROR CORRECTION CAPABILITY USING ECC AND CRC CODES

Yasushi Fukuda; Takafumi Oka, and Kazuo Tanaka, all of Odawara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 23, 1984, Ser. No. 643,419

Int. Cl.[4] G06F *11/12*; H03M *13/22*; G11B *5/09*

U.S. Cl. 371—38 **4 Claims**



1. A data recording and reproducing system for recording digital data representing visual images supplied from a higher ranked unit on a recording medium on a block basis and for transferring the digital data read from said recording medium to the higher ranked unit on a block basis, comprising:

first means for dividing each of the data blocks received from said higher ranked unit into a plurality of code words, each code word consisting of a plurality of data bytes;

second means for adding to each code word at least one byte representing an error detecting and correcting code for that code word;

third means connected to said second means for generating a respective cyclic redundancy check code for the data bytes of each respective data block and for including said cyclic redundancy check code in at least a given one of said code words of the data block;

fourth means connected to receive the output of said third means for recording said data blocks including said error correcting code and said cyclic redundancy check code therein on said recording medium and for reproducing data recorded on said recording medium;

fifth means connected to receive the data of each of said data blocks read out from said recording medium by said fourth means for subjecting said data to error detection and correction on a code word basis with the aid of said error detection and correction codes reproduced therewith and for sending information indicative of the presence or absence of a data error in each code word to said higher ranked unit together with the corrected data of each block; and

sixth means responsive to said cyclic redundancy check code in each reproduced data block for determining whether the result of said error correction of each data block carried out with the aid of said error correction codes is correct or erroneous and for generating an error signal when said error correction is found to be erroneous.

4,698,811

METHOD AND APPARATUS FOR GENERATING ERROR CORRECTION CODES FOR DIGITIZED PICTURE SIGNAL RECORDING/REPRODUCING

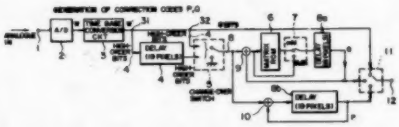
Yoshizumi Eto, Sagamihara; Masuo Umemoto, Tokyo; Hidehiro Kanada, Kodaira, and Seiichi Mita, Kanagawa, all of Japan, assignors to Hitachi, Ltd. and Hitachi Denshi Kabushiki Kaisha, both of Tokyo, Japan

Filed Jul. 19, 1985, Ser. No. 756,706

Claims priority, application Japan, Sep. 19, 1984, 59-194722

Int. Cl.[4] G06F *11/12*

U.S. Cl. 371—38 **10 Claims**



1. A digitallized picture signal recording apparatus, comprising:

(a) input means for supplying a digital signal including pixel codes each composed on plural bits in a time-sequential manner;

(b) means connected to said input means for delaying said digital signal for every predetermined number of said pixel codes;

(c) means connected to said input means and said delay means for producing pseudo pixel codes by adding more significant bits of those ones of said delayed pixel codes to more significant ones of said plural bits of said pixel codes received from said input means;

(d) means connected to receive said pseudo pixel codes for generating error correcting codes based on said pesudo pixel codes;

(e) means for adding said error correcting code to said digital signal to produce a recording data signal; and

(f) recording means for recording said recording data signal on a recording medium.

4,698,812

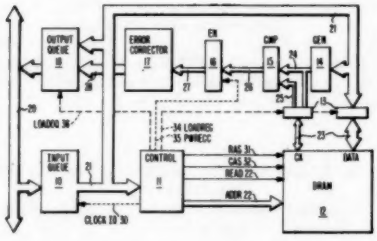
MEMORY SYSTEM EMPLOYING A ZERO DC POWER GATE ARRAY FOR ERROR CORRECTION

LuVerne R. Peterson, San Diego, Calif., assignor to Unisys Corporation, Detroit, Mich.

Filed Mar. 3, 1986, Ser. No. 835,776

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—38 **11 Claims**



1. An error-correcting memory system having a storage means which receives an address and which reads data bits and check bits at said address, a logic circuit coupled to said storage means which generates syndrome bits from said data bits and said check bits that detect whether said data bits have an error, and a zero DC power error correction circuit coupled to said logic circuit which generates multiple minterms from said syndrome bits that correct errors in said data bits; wherein said error correction circuit is comprised of:

a plurality of capacitors, one for each of said minterms;

a control means for generating a control signal that is timed with respect to the generation of said syndrome bits to be in one state when said syndrome bits are stable, and which is otherwise in an opposite state;

a charging means, coupled between said control means and said capacitors, for charging all of said capacitors only when said control signal is in said opposite state; and

a discharging means, coupled between said control means and said capacitors, for indicating the presence of said minterms by selectively discharging each capacitor as an AND function of selectable states of said syndrome bits only when said control signal is in said one state.

4,698,813

ARRANGEMENT FOR CORRECTING BURST ERRORS IN SHORTENED CYCLICAL BLOCK CODES

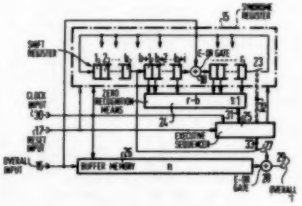
Karlheinz Erdel, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 29, 1985, Ser. No. 728,048

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1984, 3415765

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—40 **3 Claims**



1. An arrangement for correcting burst errors with a maximum length of b bits in a reception signal according to an error trapping method in cyclical block codes shortened by i bits, and wherein n bits are provided formed by r bits for a check part and k bits for an information part, comprising:

a syndrome register having r stages;

an overall input of the arrangement being connected to at least a first exclusive-OR gate connected between two of the syndrome register stages, a position of the first exclusive-OR gate being determined from coefficients of a pre-multiplication polynomial $p_2(x)$;

an output of a last stage of the syndrome register being connected via a first switch to an input of a first stage of the register and also to at least one further exclusive-OR gate connected between two stages of the register, a position of the further exclusive-OR gate being derived from a generator polynomial g(x) of the code;

a zeroes recognition means having r–b stages and connected to each of the last r–b stages of the syndrome register;

a buffer memory having n stages and which is connected to said overall input;

another exclusive-OR gate having a first input connected to an output of the buffer memory, a second input connected via a second switch to an output of the syndrome register, and an output connected to an overall output of the arrangement;

an executive sequencer means for synchronizing the first and second switches with a synchronization signal;

a clock supply means for the arrangement synchronized with a bit clock of the reception signal;

said pre-multiplication polynomial $p_2(x)$ being derived as a

division remainder in a division of a polynomial x^{b+i} by the generator polynomial g(x); and

the output of the syndrome register being provided following the b^{th} stage.

4,698,814

ARRANGEMENT FOR CHECKING THE PARITY OF PARITY-BITS CONTAINING BIT GROUPS

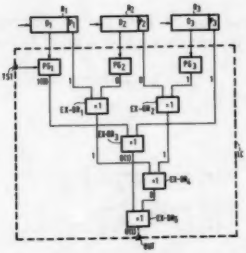
Hans H. Verheul, and Jan Matena, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 696,628, Jan. 31, 1985, abandoned. This application Jan. 28, 1987, Ser. No. 9,114

Claims priority, application Netherlands, Feb. 6, 1984, 8400358; Austria, Jan. 31, 1986, 237/86

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—49 **2 Claims**



1. A logic circuit for checking in parallel the parity of each of a plurality of parity bit-containing bit groups, such logic circuit having a single output terminal and comprising: n parity generators (PG_1, PG_2, ... PG_n) each coupled to a bit group for generating the parity bit of said bit group; n comparison circuits each having first and second inputs and an output, an output of each of said parity generators being connected to a first input of a comparison circuit, the parity bit of each of said bit groups being applied to said second input of said comparison circuit in such manner that at a specific comparison circuit the generated parity bit applied to said first input is derived from a different bit group than the parity bit applied to said second input, the outputs of said comparison circuits being connected so as to produce, at said output terminal of said logic network, a logic signal which has a first value only if each of said generated parity bits is in agreement with the parity bit contained in the corresponding bit group and which has a second value if any of said generated parity bits is not in agreement with the parity bit of the corresponding bit group.

4,698,815

EFFICIENCY ENHANCED FREE ELECTRON LASER

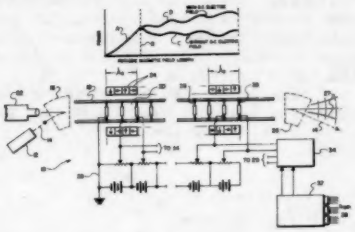
Anup Bhowmik, Newbury Park, and Wayne A. McMullin, Chatsworth, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 9, 1986, Ser. No. 917,340

Int. Cl.[4] H01S *3/00*

U.S. Cl. 372—2 **15 Claims**

1. A method for enhancing the efficiency of a free electron laser having a relativistic electron beam superimposed and copropagating with an intense electromagnetic wave within a transverse periodic d.c. magnetic field, including the step of:



applying a d.c. electric field along the axis of the electron beam at saturation thereby converting d.c. potential to electromagnetic radiation without gain degradation.

4,698,816

OPTICAL TRANSMISSION FILTER

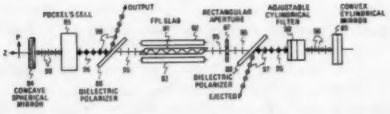
Myung K. Chun, Manlius, N.Y., assignor to General Electric Co., Schenectady, N.Y.

Continuation-in-part of Ser. No. 450,972, Dec. 20, 1982, abandoned. This application Aug. 20, 1984, Ser. No. 642,332

The portion of the term of this patent subsequent to Mar. 11, 2003, has been disclaimed.

Int. Cl.[4] H01S *3/098*

U.S. Cl. 372—19 **13 Claims**



1. An optical transmission filter for effecting continuous phase compensation of a beam of light polarized in a P dimension, the elements of said beam having a phase which deviates from an ideal reference phase as a continuous function of element position, said filter having an optical axis which is concentric with the beam axis and comprising:

A. a first lens of birefringent material of a first center thickness having a first surface which is flat and a second surface which has a predetermined radius of curvature,

B. a second lens of birefringent material of a second center thickness having a first surface which is flat and a second surface which has a radius of curvature equal to the radius of curvature of said first lens but of opposite sign,

the surfaces said lenses being oriented orthogonal to and concentric with said optical axis, the crystal optical axes of the materials of said lenses being oriented in orthogonal positions along said optical axis and at angle of 45° to said P dimension, with said second surfaces adjacent.

4,698,817

PEAK OPTICAL POWER CONTROL CIRCUIT FOR LASER DRIVER

Gregory S. Burley, Edmonton, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Feb. 28, 1985, Ser. No. 706,686

Int. Cl.[4] H01S *3/13*

U.S. Cl. 372—31 **8 Claims**

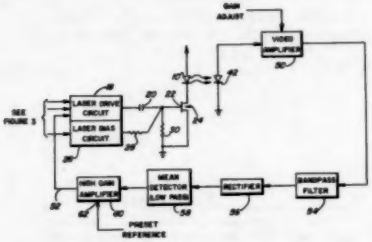
1. Apparatus for controlling the peak power of a light output signal of an injection laser, comprising:

drive means for applying a drive current to said laser to modulate its light output in dependence upon an input signal having a predetermined power spectrum;

detection means for detecting light output from said laser and providing a corresponding signal;

filter means for filtering said corresponding signal to provide a filtered signal having a bandwidth significantly less than that of said laser output signal;

peak optical power detection means for responding to the filtered signal to provide a signal proportional to the peak amplitude of said laser output signal; and



comparator means for comparing such proportional signal with a reference that is predetermined relative to said predetermined power spectrum and in dependence upon such comparison controlling said drive means to vary said modulating drive current and control said peak power of said laser.

4,698,818

AIR-COOLED DISCHARGE TUBE FOR AN ION LASER

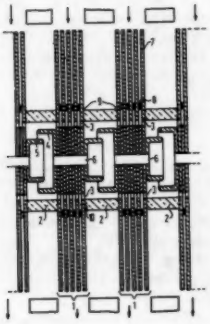
Hinrich Heynisch, Graefelfing, and Klemens Huebner, Ottobrunn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 1, 1986, Ser. No. 891,943

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534844

Int. Cl.⁴ H01S *3/04*

U.S. Cl. 372—34 **8 Claims**



1. An air-cooled discharge tube for an ion laser, comprising:

cooling packets each having a plurality of metal cooling disks interleaved with metal spacer disks in vacuum-tight fashion,

each of said cooling and spacer disks having an opening, said openings being arranged coaxially to one another in said cooling and spacer disks to form a discharge channel,

shieldings applied to ones of said cooling disks concentrically with said discharge channel,

insulator tubes affixed vacuum-tight to end faces of said cooling packets and arranged at least approximately coaxially within said discharge tube,

an inside diameter of each of said insulator tubes being larger by a multiple than the diameter of said discharge channel and the length of each of said insulator tubes being smaller than the diameter of said insulator tubes,

said cooling disks and said spacer disks having recesses radially offset relative to the axis of said discharge tube,

said recesses of neighboring ones of said cooling disks and said spacer disks overlap, a plurality of said recesses in said cooling disks and said spacer disks being disposed at the same distance from the axis of said discharge channel,

said recesses in said cooling disks extend radially at most up to the inside wall of adjoining ones of said insulator tubes, said recesses in said spacer disks extending radially at least up to an outside wall of adjoining ones of said insulator tubes, and

mirrors forming a resonator are rigidly mechanically connected to said discharge tube.

4,698,819

POWER SUPPLY UNIT FOR A LASER TUBE

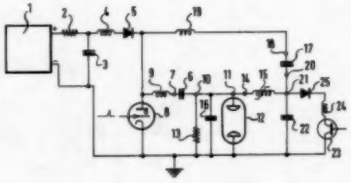
Antoine Hirth, Hegenheim, and Antoine Simon, St. Louis, both of France, assignors to Institut Franco-Allemand de Recherches de Saint-Louis, St. Louis, France

Filed Mar. 21, 1986, Ser. No. 842,502

Claims priority, application France, Mar. 22, 1985, 85 04285

Int. Cl.⁴ H01S *3/00*

U.S. Cl. 372—38 **10 Claims**



1. A power supply unit for a laser tube having a means for pulse formation and a means for pulse triggering, said power supply unit comprising:

a pre-ionization circuit means to form a pre-ionization pulse;

an excitation circuit means to form an excitation pulse; and

a synchronization device having a switch, said synchronization device located between said pre-ionization circuit means and said excitation circuit means, said synchronization device synchronizes the pre-ionization pulse and the excitation pulse when said switch is enabled.

4,698,820

MAGNETIC DEVICE AND METHOD OF MANUFACTURE

Charles D. Brandle, Jr., Basking Ridge; Vincent J. Fratello, and Raymond Wolfe, both of New Providence, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 1, 1986, Ser. No. 858,396

Int. Cl.⁴ H01S *3/16*

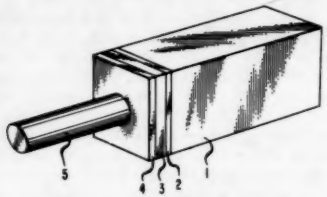
U.S. Cl. 372—41 **15 Claims**

1. A device comprising a body of magnetic material, characterized in that said body consists essentially of a garnet material as represented by the formula:

$$Nd_xPr_yR_{3-x-y}T_2Fe_{5-z}O_{12},$$

where either x+y has a value which is greater than 2 or else y

has a value which is greater than 1.8, where R stands for at least one rare-earth crystallographic site substituent, where T



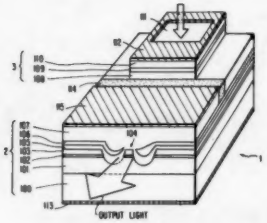
stands for at least one iron crystallographic site substituent, and where z is greater than or equal to zero.

4,698,821

INTEGRATED LIGHT EMITTING/RECEIVING AMPLIFIER ELEMENT

Tomoji Terakado, and Yuichi Odagiri, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed May 14, 1985, Ser. No. 733,683
Claims priority, application Japan, May 17, 1984, 59-99122
Int. Cl.[4] H01S *3/19*
U.S. Cl. 372—50 **3 Claims**



1. An integrated light emitting/receiving element comprising:

a semiconductor substrate of a first conductivity type;

a semiconductor laser, formed on said semiconductor substrate, comprising a first semiconductor layer of said first conductivity type, a second semiconductor layer emitting light upon injection of an electric current, and a third semiconductor layer of a second conductivity type opposite to said first conductivity type;

a phototransistor comprising a collector layer of said second conductivity type, a base layer of said first conductivity type and an emitter layer of said second conductivity type, successively formed on said third semiconductor layer of said semiconductor laser, said phototransistor being formed on a first portion of said laser;

a first electrode formed on a side of said semiconductor substrate opposite said first semiconductor layer;

a second electrode formed on said emitter layer, leaving an opening through which to let incident light in, said light emitting/receiving element amplifying light by injecting into said semiconductor layer a multiplied photocurrent generated by said phototransistor in response to incident light coming in through said opening; and

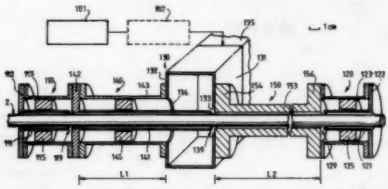
a third electrode formed on said third semiconductor layer in a portion of said laser other than said first portion, said laser being biased substantially at the threshold level of laser oscillation through said third electrode.

4,698,822

APPARATUS FOR EXCITING A PLASMA IN A COLUMN OF GAS BY MEANS OF MICROWAVES, IN PARTICULAR FOR PROVIDING AN ION LASER

Philippe Leprince, Gif sur Yvette; Jean Marec, Boullay les Troux Limours; Serge Saada, Joinville le Pont; Emile Bloyet, Gif sur Yvette, and Jacques Migne, Bretigny sur Orge, all of France, assignors to Centre National de la Recherche Scientifique (C.N.R.S.), Paris, France

Filed Mar. 28, 1986, Ser. No. 845,318
Claims priority, application France, Mar. 28, 1985, 85 04698
Int. Cl.[4] H01S *3/03*
U.S. Cl. 372—70 **19 Claims**



1. An apparatus for exciting a plasma in a waveguide having a column of gas by means of microwaves, the apparatus being of the type comprising:

a tubular member suitable for containing said column of gas; and

microwave-applying means surrounding said tubular member and coupled thereto via an annular gap suitable for generating electric field at microwave frequency at the periphery of said tubular member, with longitudinal and radial components of said electric field exciting a plasma in said column of gas;

said apparatus including the improvement that first and second microwave short circuits are provided at respective ends of said microwave-applying means, said short circuits being coupled to said tubular member and being adjusted to confine said plasma in that portion of said tubular member which extends between its couplings with said short circuits;

the plasma which is not uniform along the tubular member then becoming the seat of very high intensity standing microwaves.

4,698,823

SYSTEM FOR REDUCING THE SENSITIVITY OF A RING LASER GYRO TO CHANGES IN A MAGNETIC FIELD

Laurence G. Cote, Thousand Oaks, Calif., assignor to Litton Systems Inc., Beveraly Hills, Calif.

Filed Sep. 12, 1984, Ser. No. 649,564
Int. Cl.[4] H01S *3/08*
U.S. Cl. 372—99 **9 Claims**

1. A system for reducing the sensitivity of a ring laser gyro to changes in a magnetic field, comprising:

a laser cavity;

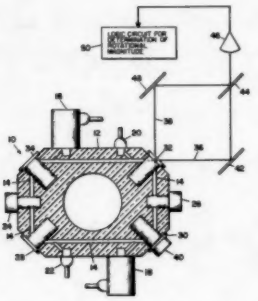
means for propagating at least one laser beam through said laser cavity at a predetermined frequency;

mirror means mounted within said laser cavity for directing said at least one laser beam within said laser cavity;

said at least one laser beam having a polarized beam with a first, preferred component thereof polarized perpendicular to a plane of incidence of said mirror means, including a coating, and a second component thereof polarized parallel to said plane;

said mirror means having a maximum reflectivity of said perpendicular and parallel polarized light beams at a frequency slightly offset from said predetermined frequency of said laser, wherein said mirror means causes said reflec-

tivity of said perpendicular polarized light beam to remain near its maximum value while said reflectivity of said



parallel polarized light beam is reduced whereby said sensitivity to said changes in said magnetic field is reduced.

4,698,824

METHOD FOR CONTROLLING AN ELECTROTHERMAL PROCESS

Harry Willners, Björnbo 22-218, S-18146 Lidingö, Sweden, and Ove Kjölseth, Evje Terasse 4, N-1300 Sandvika, Norway

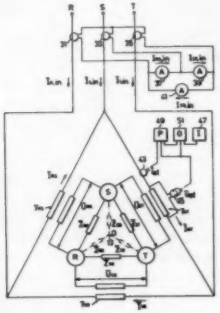
PCT No. PCT/SE85/00083, § 371 Date Oct. 21, 1985, § 102(e) Date Oct. 21, 1985, PCT Pub. No. WO85/03834, PCT Pub. Date Aug. 29, 1985

PCT Filed Feb. 19, 1985, Ser. No. 794,923

Claims priority, application Sweden, Feb. 21, 1984, 84009489

Int. Cl.[4] H05B *7/148*

U.S. Cl. 373—49 **10 Claims**



1. A method of controlling an electrothermal process through a resistive medium, comprising the steps of:

inserting a plurality of electrodes into the resistive medium;

supplying an alternating current to the electrodes so as to heat the resistive medium by passing current therethrough;

forming, with the electrodes, three current-supplied network junction points R, S, and T with a load in a triangular configuration, the load having an electrical zero point;

calculating load impedances of the electrodes;

controlling the positions of the electrodes in the resistive medium on the basis of the calculated load impedances;

taking into account a delta-star transformation by observing the prevailing relationship between delta network impedances and star network impedances;

calculating auxiliary values Z_1, Z_2 and Z_3 of the load, the auxiliary values Z_1, Z_2 and Z_3 being at least representative approximations of the equivalent star network impedances Z_{RO}, Z_{SO} and Z_{TO}, respectively, through the corresponding relationships $Z_1 \approx K_1 \cdot Z_{RO}$, $Z_2 \approx K_2 \cdot Z_{SO}$ and $Z_3 \approx K_3 \cdot Z_{TO}$, where factors K_1, K_2 and K_3 are approximately equal; and

adjusting the electrical zero point of the load with the calculated auxiliary values in accordance with desired relationships between the equivalent star network impedances by selectively controlling the respective positions of the electrodes in the resistive medium to control the electrothermal process.

4,698,825

PROTECTIVE COATING OF TEMPERATURE RESISTANT MATERIALS FOR THE METAL SHAFT OF COMBINATION ELECTRODES FOR THE ELECTRIC STEEL PRODUCTION

Franz Schieber, Röthenbach/Pegnitz; Dieter Zöllner, Schwaig/-Nürnberg; Inge Lauterbach, Nürnberg; Konrad Koziol, Röthenbach/Pegnitz; Christine Zöllner, Schwaig/Pegnitz, and Thomas Taube, Erlangen-Steudach, all of Fed. Rep. of Germany, assignors to Arc Technologies Systems Ltd., Georgetown, Ky.X

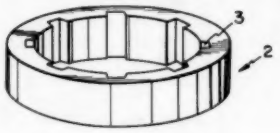
Continuation of Ser. No. 486,560, Apr. 19, 1983, abandoned. This application Jul. 22, 1985, Ser. No. 757,697

Claims priority, application Switzerland, Apr. 26, 1982, 2586/82

The portion of the term of this patent subsequent to Aug. 13, 2002, has been disclaimed.

Int. Cl.[4] H05B *7/08*

U.S. Cl. 373—93 **7 Claims**



1. A protected combination electrode resistant to deleterious accumulations from liquid metal and slag, thereby adapted to be readily insertable and removable through a furnace lid opening, said combination comprising:

an upper electrode metallic shaft section;

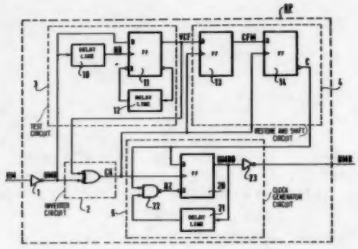
a consumable carbon lower section attached by threaded engagement to said uppper metallic section; and

removable, oxidation-resistant moldings of carbon embedded in a ceramic matrix, sintered at a temperature of less than about 1600° C. and removably mounted around said upper metallic section, the carbon of said moldings having graphitic structural elements, with the carbon portion being present in a proportion of between about twenty and eighty percent by weight and the ceramic matrix consisting essentially of fireclay, clay, kaolins, silicon dioxide, sillimanite, Al_2O_3, MgO, magnesium chloride, sintered dolomite, magnesium silicate, magnesium-chromium oxide ore, forsterite, bauxite, silicon carbide, silicon nitride, silica sand, zircon oxides, zircon mineral, titanium oxide, aluminum silicate, aluminum titanate containing silicate, spinels, kieselguhr, expanded fireclay, expanded clay, expanded vermiculite, expanded perlite, spherical corundum and mixtures thereof, with the ceramic portion being present in a proportion of between about twenty and eighty percent by weight.

4,698,826
CLOCK REPEATER FOR TRIPLICATED CLOCK DISTRIBUTOR

Alain Denhez, Velizy-Villacoublay; Francis Hargoaa, Paris, and Jean Aubrée, Bougival, all of France, assignors to Alcatel, Paris, France

Filed Feb. 6, 1986, Ser. No. 826,696
Claims priority, application France, Feb. 7, 1985, 85 01722
Int. Cl.[4] H04L *7/06*
U.S. Cl. 375—3 **5 Claims**



1. Repeater for connecting to a receiver a clock producing a clock and synchronization signal consisting of a clock signal and a synchronization signal that comprises one positive pulse and one negative pulse, each pulse having a duration equal to one period of said clock signal, said repeater comprising an inverter adapted to invert an incoming clock and synchronization signal, an inverter circuit having a first input connected to said inverter, a test circuit, a restore and shift circuit and a clock generator circuit, in which repeater, an input of said test circuit is connected to said inverter, an output of said test circuit is connected further to a second input of said inverter circuit and secondly to said restore and shift circuit, said test circuit is adapted to test the duration to signal pulses from said inverter in order to detect said synchronization signal and to generate a pulse in respoonse to such detection of said synchronization signal, said restore and shift circuit has a first input connected to said test circuit, second and third inputs connected to an output of said inverter circuit and an output connected to said clock generator circuit, said restore and shift circuit is adapted to generate a pulse the duration of which is equal to that of one pulse of said synchronization signal and which is shifted by two periods of said clock signal relative to said negative pulse of said synchronization signal, and said clock generator circuit has its input connected to the output of said restore and shift circuit and to said inverter circuit and is adapted to produce at its output a clock and synchronization signal.

4,698,827
GENERALIZED POLYPHASE CODE PULSE COMPRESSOR

Frank F. Kretschmer, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

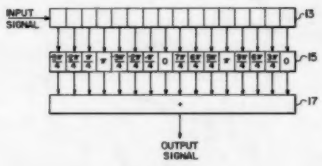
Filed Nov. 27, 1981, Ser. No. 325,454
Int. Cl.[4] G01S *13/28*
U.S. Cl. 375—86 **4 Claims**

4. A method of decoding the pattern of phase changes within a pulse, the pulse being subdivided into an integral number N of subsequences of subpulses, each subsequence having N subpulses at which the phase is changed so forming a polyphase code that is tolerant of precompression bandwidth limitations, comprising the steps of:

providing a decoding phase rotation $-\Delta\phi_{k,p}$ to each kth subpulse in each pth subsequence of the pulse, where

$$\Delta\phi_{k,p}=(2\pi/N)[k+pN][p-(\tfrac{1}{2})(N-1)]$$

$k=0, 1, 2, \ldots, N-1$



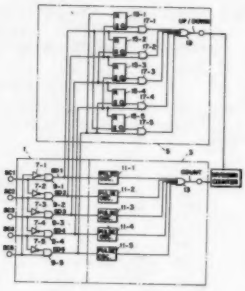
$p=0, 1, 2, \ldots, N-1$; and

adding the phase-rotated subpulses at the same time.

4,698,828
POSITION AND DIRECTION OF MOTION SENSING SYSTEM

Yukio Hiramoto, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 26, 1986, Ser. No. 833,022
Claims priority, application Japan, Feb. 28, 1985, 60-37646
Int. Cl.[4] G06M *3/00*
U.S. Cl. 377—3 **14 Claims**



1. A position sensing system comprising:

position signal generating means for producing a series of component position signals each of which varies periodically in accordance with displacement of an object in such a manner that said component signals differ in phase successively by a predetermined phase difference in a predetermined forward sequence of said component signals when the object moves in a forward direction and in a reverse sequence opposite to said forward sequence when the object moves in a reverse direction opposite to said forward direction;

counting means for determining the position of the object by counting occurences of a predetermined change which recurs periodically in each of said component signals, said counting means having a positive mode for increasing a count by a predetermined number for each occurrence of said predetermined change and a negative mode for decreasing the count by the predetermined number for each occurrence of said change; and

direction determining means for determining, upon each occurrence of said change of said component position signals, whether said change occurs in the forward sequence or in the reverse sequence, and switching said counting means between said positive and negative modes in dependence on the result of the determination of the sequence, said direction determining means comprising a set of direction determining component units each of

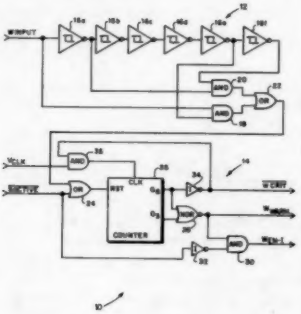
which receives at least a first input signal which is uniquely one of said component position signals and a second input signal which is said component position signal that is next in one of said forward and reverse sequences to said first input signal, each of said component units responding to each occurrence of said change in said first input signal in a predetermined manner only if said change occurs in said second input signal immediately before the current occurrence.

4,698,829

MONITORING SYSTEM FOR VERIFYING THAT AN INPUT SIGNAL IS TOGGLING AT A MINIMUM FREQUENCY

Peter C. Di Giulio, Easton, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Mar. 12, 1985, Ser. No. 710,797
Int. Cl.[4] G07C *3/00, 3/02*
U.S. Cl. 377—16 **31 Claims**



1. Monitoring system for verifying that an input signal is toggling at a minimum frequency, comprising:

edge detection means for providing an output signal in response to each transition in the state of the input signal;

resettable means responsive to the output signal from said edge detection means for resetting upon receipt of an output signal from said edge detection means within a first reset period; and

said resettable means generating a first output signal upon failing to receive an output signal from said edge detection means within the first reset period and generating a second output signal upon failing to receive an output signal from said edge detection means within a second following reset period.

4,698,830

SHIFT REGISTER LATCH ARRANGEMENT FOR ENHANCED TESTABILITY IN DIFFERENTIAL CASCODE VOLTAGE SWITCH CIRCUIT

Zeev Barzilai, Millwood; Vijay S. Iyengar, Peekskill, both of N.Y., and Gabriel M. Silberman, Haifa, Israel, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 10, 1986, Ser. No. 850,189
Int. Cl.[4] G01R *31/28;* **G11C** *29/00*
U.S. Cl. 377—19 **6 Claims**

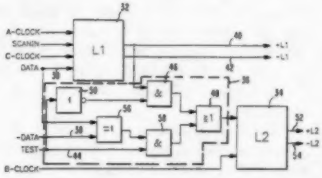
1. A shift register latch arrangement for a combinational logic circuit having at least one pair of output lines wherein said combinational logic circuit Produces either complementary output signals indicative of a result of a logical function performed or non-complementary output signals on said output lines depending on whether or not a fault in said combinational logic circuit is propagated to said output lines, said shift register latch arrangement comprising:

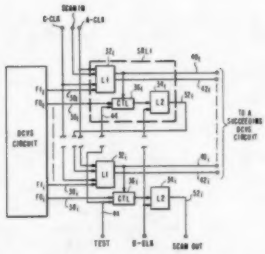
first clock means for providing a first clock signal train at an output means thereof;

a first latch device having at least one output line, said first latch device being coupled and responsive to one of said combinational logic circuit output lines and said first clock signal output means for latching and producing at said first latch device output line, during each period of said first clock signal train, one of said combinational logic circuit output signals;

second clock means for providing a second clock signal train at an output means thereof;

a second latch device having input means coupled to said first latch device output line and having at least one output line, said second latch device being coupled and responsive to said second latch device input means and said second clock signal output means for latching and producing at said second latch device output line, during each period of said second clock signal train, said one of the combinational logic circuit output signals; and





test data input means including exclusive OR circuit means connected to said combinational logic circuit output lines, said test data input means further including means coupled and responsive to a test control signal for disabling said second latch device input means, said exclusive OR means having an output coupled to said second latch device input means, said second latch device latching and producing an exclusive ORed result of said combinational logic circuit output signals on said second latch device output line.

4,698,831

CMOS INCREMENTER CELL SUITABLE FOR HIGH SPEED OPERATIONS

Yousef Vazir-Zadeh, Sunnyvale, assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jun. 20, 1986, Ser. No. 876,494
Int. Cl.[4] H03K *21/38, 23/44*
U.S. Cl. 377—117 **16 Claims**

1. An incrementer cell comprising:

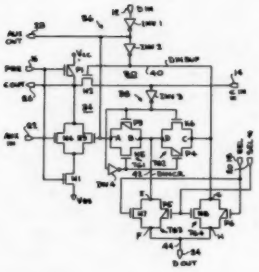
an input section being formed of a buffer stage and an incrementer stage;

said buffer stage having a first inverter and a second inverter, said first inverter having its input coupled to a first input terminal for receiving an input data signal, said second inverter having its input coupled to the ouput of said first inverter;

said incrementer stage being formed of a third inverter, a fourth inverter, a first transmission gate and a second transmission gate, said third inverter having its input coupled to a second input terminal for receiving an input carry signal and its output coupled to the input of said fourth inverter, said outputs of said third and fourth inverters being connected to control nodes of said first and second transmission gates, said first transmission gate having its input node coupled to the output of said first inverter, said second transmission gate having its input node coupled to the output of said second inverter;

an output section being formed of a third transmission gate and a fourth transmission gate, said third transmission gate having its input node coupled to the output nodes of said first and second transmission gates, said fourth transmission gate having its input node coupled to the ouput of said second inverter, said third and fourth transmission gates having their control nodes connected to third and fourth input terminals for receiving a select signal and its complement;

a carry section including a P-channel transistor, a first N-channel transistor, a second N-channel transistor, a third N-channel transistor and a fourth N-channel transistor;



said P-channel transistor having its source connected to a supply potential and its gate connected to the gate of said first N-channel transistor, said P-channel transistor having its drain connected to the source of said second N-channel transistor and to the drains of said third and fourth N-channel transistors;

said first N-channel transistor having its drain connected to the sources of said third and fourth N-channel transistors and its source connected to a ground potential, said second N-channel transistor having its gate connected to the output of said second inverter and its drain connected to said second input terminal, said third N-channel transistor having its gate connected to the output of said first inverter, the common gates of said P-channel transistor and said first N-channel transistors being further connected to a fifth input terminal for receiving a clock signal; and

the drain of said P-channel transistor being further connected to a second output terminal to provide a carry-out signal, the gate of said fourth N-channel transistor being connected to a sixth input terminal for receiving an auxiliary input signal, the output of said first inverter being further connected to a third output terminal to provide an output auxiliary signal.

4,698,832

PROCEDURE AND MEANS FOR MEASURING WITH THE AID OF A RADIO-ISOTOPE SOURCE THE DISTRIBUTION OF FILLERS IN A WEB

Juhani Kuusi, Helsinki, Finland, assignor to Robotest Oy, Finland

PCT No. PCT/FI83/00075, § 371 Date Jul. 30, 1984, § 102(e) Date Jul. 30, 1984, PCT Pub. No. WO84/02190, PCT Pub. Date Jun. 7, 1984

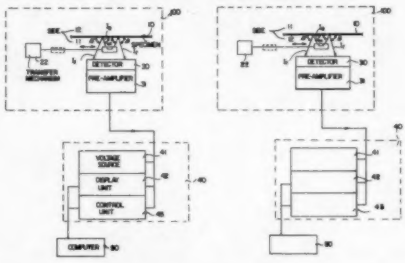
PCT Filed Nov. 30, 1983, Ser. No. 638,487

Claims priority, application Finland, Dec. 1, 1982, 824141

The portion of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] G01N *23/223, 33/34*

U.S. Cl. 378—46 **19 Claims**



1. A method of measuring, without destroying the specimen, the distribution in the thickness direction of the filler and/or coating materials of paper or cardboard, and the content of said materials, wherein radiation emitted by a radio-isotope source is used to excite in the material component to be examined, of the object of measurement, its characteristic X-ray fluorescent radiation, the intensity of said characteristic radiation being observed, measurements are made on both sides of the paper or cardboard under examination, the contents of filler components are determined by X-ray absorption measurements for eliminating the effects of these components disturbing the distribution measurement, and measurement is made of the base weight of the paper or cardboard under examination, in g/m^2, by radiation absorption measurement, said method comprising the steps of

making a number of X-ray absorption measurements, the number of measurements being at least equal to the number of different filler components which are to be considered separate from the point of view of X-ray absorption measurements, for determining the contents of the different filler components and the coating materials by X-ray radiation;

making a number of measurements of the characteristic X-ray fluorescent radiation of the material components excited by a radioisotope source and

determining the distribution of fillers and coating materials by calculative joint processing of the results from said measurements.

4,698,833

SUBASSEMBLY, METHOD AND SYSTEM FOR MONOCHROMATIZING X-RAYS

John E. Keem, Bloomfield Hills, and Gerald F. Marshall, Grosse Pointe Woods, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

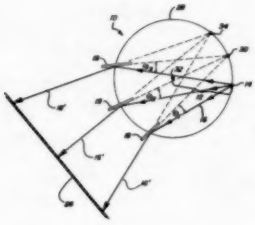
Filed May 14, 1985, Ser. No. 733,893

Int. Cl.[4] G01N *23/22*

U.S. Cl. 378—84 **26 Claims**

1. A parallel beam X-ray monochromatizer subassembly (**34** of FIG. **4**) comprising a plurality of individual X-ray dispersive structures (**18**), the individual X-ray dispersive structures (**18**) having at least one surface with a plurality of layer sets (**22**)

formed thereon, the layer sets (22) on each of the X-ray dispersive structures (18) being different and having substantially different X-ray dispersive properties, the individual X-ray dispersive structures (18) being arrayed about a circle (28) with the optical center of each individual X-ray dispersive structure (18) being on the circumference of the circle (28) and adapted



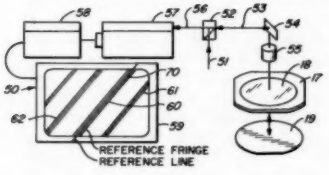
for use with an X-ray point source (14) so that the tangent plane of X-rays (16) from the point source (14) at the optical center of each individual X-ray dispersive structure (18) lies on the circle (28) at a center of rotation (30), such that each structure (18) intersects the X-rays (16) at substantially different angles (theta-1, theta-2, theta-3) so as to reflect parallel, reflected, monochromatized X-rays (16').

4,698,834

X-RAY MASK MEMBRANE DEFLECTION COMPENSATOR AND METHOD

Ronnie Northrup, and Bernard Fay, both of San Jose, Calif., assignors to Micronix Corporation, Los Gatos, Calif.

Filed Feb. 12, 1986, Ser. No. 828,837
Int. Cl.[4] G21K 5/08
U.S. Cl. 378—34 **19 Claims**



15. An x-ray mask membrane deflection compensator for providing an indication of a constant even gap between a planar mask membrane, juxtaposed to an x-ray chamber having a source of gaseous media therein, and a semiconductor wafer to be imaged by the mask membrane wherein said planar mask membrane is exposed on one surface to said source of x-ray chamber gaseous media and on an opposed second surface to a source of semiconductor wafer processing gas; and wherein said semiconductor wafer is spaced from said mask membrane and generally parallel thereto, said wafer processing gas being generally confined in a space between said mask membrane and said semiconductor wafer; said compensator comprising:

a coherent optical illumination source;

means for passing incident light from said source through a portion of said mask membrane to a surface of said semiconductor wafer facing said mask membrane;

means for detecting beams including interference fringes from said incident light, reflecting from said mask membrane and reflecting from said semiconductor wafer surface;

means for forming an image of said interference fringes; and

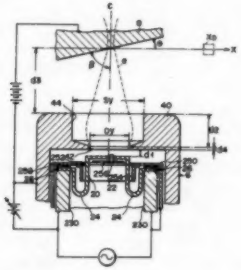
means operable in response to deflection of said mask membrane and a resultant movement of said image of said interference fringes, caused by differential pressure of said gaseous media and said pressuring gas on said one surface and second surface of said mask membrane, respectively, for adjusting the position of said interference fringes on said image, by control of the pressure of said gaseous media and said processing gas to null said mask membrane to an undeflected position representing a zero differential pressure across the mask.

4,698,835

X-RAY TUBE APPARATUS

Katsuhiro Ono, Kawasaki; Tatsuya Sakuma, Yokohama, and Hiroshi Takahashi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 30, 1985, Ser. No. 739,101
Claims priority, application Japan, May 31, 1984, 59-111905; Nov. 27, 1984, 59-248619
Int. Cl.[4] H01J 35/06
U.S. Cl. 378—136 **8 Claims**



1. An X-ray tube apparatus comprising:

a vacuum envelope having a tube axis; and

an anode target and a cathode assembly disposed in said vacuum envelope and facing each other;

said cathode assembly including:

a filament having a flat sheet-like electron emission portion for emitting an electron beam, a pair of U-shaped portions provided at the opposite ends of said electron emission portion, in such a manner that they extend from the opposite ends in the direction away from said anode target and bend back toward the anode target, and a pair of supported end portions each extending from said U-shaped portion, respectively;

filament supports for supporting said supported end portions of said filament;

a beam shaping electrode for passing through an electron beam from said electron emission portion of said filament and focusing said electron beam toward said anode target;

a shielding member disposed between an inner wall surface of said beam shaping electrode and each said U-shaped portion of said filament; and

an auxiliary shielding member extending from said shielding member and into a gap defined by each said U-shaped portion, said shielding member and said auxiliary shielding member being maintained at a potential substantially equal to a potential applied to said filament.

4,698,836

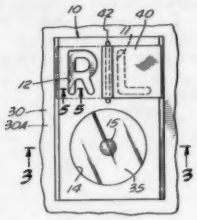
MEANS AND TECHNIQUES USEFUL IN MARKING X-RAY FILM

John L. Minasian, 2319 W. Magnolia Blvd., Burbank, Calif. 91506

Continuation-in-part of Ser. No. 664,327, Oct. 24, 1984, abandoned. This application Aug. 11, 1986, Ser. No. 895,328
Int. Cl.[4] G03B 42/02
U.S. Cl. 378—162 **3 Claims**

1. A marker for quick attachment to and detachment from a

cassette containing X-ray film including a single body of material which is sufficiently thick to be opaque to X-rays; said material lhaving two open cavity portions therein extending in the direction of the thickness of said material; one of said cavity portions being sufficiently deep to be X-ray transparent and shaped to produce the image of a first symbol; the other one of said cavity portions being sufficiently deep to be X-ray transparent and shaped to produce an image of a second symbol; an X-ray opaque member; and means mounting said X-ray opaque member on said body for movement from a first position over said first cavity portion to a secod position over said second cavity portion and vice versa; said material having said cavity portions being magnet material for quick attachment to and detachment from the cassette; said opaque member includes magnetizable material which is attracted to and maintained in a locked condition by said magnet material when said opaque member is over either said first or second cavity portion; said magnet material and said opaque member preventing the transmission of X-rays onto the film and thereby assuring the same clear background on which a dark image of either cavity portion is developed on the film.

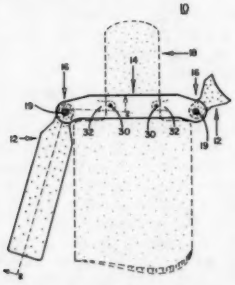


4,698,837

ARMBOARD MOUNTING ASSEMBLY

Kip Van Steenburg, Sudbury, Mass., assignor to Amatech Corporation, Concord, Mass.

Filed Mar. 11, 1985, Ser. No. 710,050
Int. Cl.[4] H05G *1/00*
U.S. Cl. 378—208 **35 Claims**



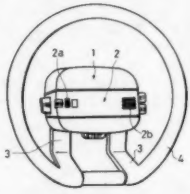
1. An armboard mounting assembly comprising:
an armboard having a proximate end and a distal end;
an armboard mount;
means for pivotably interconnecting said armboard and said armboard mount for enabling rotation of said armboard about a pivot axis;
said rotatable armboard and armboard mount overlapping to define at least one pair of adjacent sections;
means for providing gripping between said adjacent sections to inhibit rotation about said pivot axis;
said armboard, said armboard mount, said means for pivotably interconnecting, and said means for providing gripping being radiologically translucent; and
attenuating means, disposed on at least one of said adjacent sections, for balancing radiological attenuation among said adjacent sections, said means for pivotably interconnecting, and said means for providing gripping.

4,698,838

STEERING WHEEL HAVING A TELEPHONE

Masanobu Ishikawa, Nagoya; Masumi Nishikawa, Toyoake; Satoshi Ono, Inazawa; Tetsushi Hiramitsu, Ichinomiya, and Atsuo Hirano, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyoda Gosei Co., Ltd., Nishikasugai, both of, Japan

Filed Sep. 27, 1985, Ser. No. 780,841
Claims priority, application Japan, Sep. 29, 1984, 59-205183; Sep. 29, 1984, 59-205184; Sep. 29, 1984, 59-147507[U]; Sep. 29, 1984, 59-147508[U]; Sep. 29, 1984, 59-148430[U]
Int. Cl.[4] H01M *1/23*
U.S. Cl. 379—58 **14 Claims**



1. A steering wheel having a telephone, comprising:
a boss portion secured to a steering shaft;
a steering portion operated by a driver;
a spoke portion for integrally connecting said boss portion and said steering portion, and
a pad portion held on said boss portion;
said pad portion comprising a base held on said boss portion and a telephone detachably held on said base;
said base comprising a receiving recess in which said telephone is received, a swing projection with which said telephone is engaged, a lock devise comprising a swing arm urged in a given rotational direction and having an engaging projection at the end thereof, a lock pawl and a lock releasing lever for driving said lock pawl; and
said telephone having an engaging recess in engagement with said swing projection.

4,698,839

MOBILE TELEPHONE SWITCHING OFFICE

David B. DeVaney, 111 Sweetwater Blvd. N., Longwood, Fla. 32779; Donald J. Harper, 140 Hilltop Pl., and Thomas D. Short, 1005 Woodall Dr., both of Altamonte Springs, Fla. 32701

Filed Jun. 3, 1986, Ser. No. 870,151
Int. Cl.[4] H04Q *7/04*
U.S. Cl. 379—60 **7 Claims**

1. A mobile telephone switching office for switching calls among landline subscribers over landline telephone lines and mobile subsribers over a plurality of cellular radiotelephone voice channels, said mobile telephone switching office including:
A. switch means for performing switching operations among said telephone lines and a plurality of trunk lines;
B. central office processing means for controlling said switch means to provide voice paths between respective lines through said switch means in response to mobile call progress messages and for generating mobile call status messages in response to the status of a call involving a mobile operator, at least one of said mobile call status messages being a termination request message;

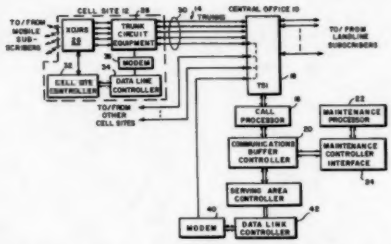
C. at least one cell site means connected to at least one of said trunk lines and including:

i. voice transceiving means for generating signals for transmission over said voice channels in response to voice signals from said trunk lines and for receiving signals from said voice channels and generating voice signals for transmission over said trunk lines;

ii. mobile message receiving means for receiving mobile request messages from said mobile subscribers over a paging channel, at least one of said mobile request messages being an origination message;

iii. message transfer means for generating mobile control messages for transfer to said central office processing means and for receiving mobile call status messages from said central office processing means; and

iv. control means for selecting a voice channel and a trunk to carry voice signals between said mobile subscriber and said switch means in response to the receipt of an origination message or a termination message.

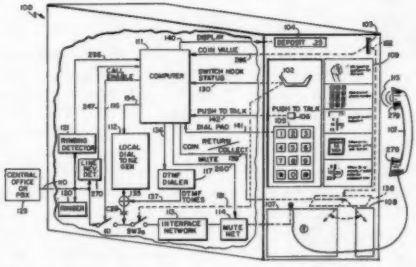


4,698,840

COIN OPERATED TELEPHONE

Lee V. Dively, and Jack M. Grubbs, both of Tulsa, Okla., assignors to Seiscor Technologies, Inc., Tulsa, Okla.

Filed Mar. 22, 1985, Ser. No. 714,771
Int. Cl.[4] H04M *17/00*
U.S. Cl. 379—112 **16 Claims**



1. A coin operated telephone comprising:

(a) a handset having an earphone;

(b) a switchhook for receiving the handset and for enabling removal of the handset from the switchhook;

(c) a dial tone generator disposed within the coin operated telephone;

(d) means for coupling the dial tone generator to the earphone when the handset is removed from the switchhook;

(e) means for entering a telephone number of a called party; and

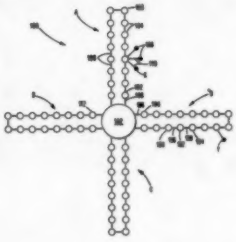
(f) means for enabling coupling of the coin operated telephone to a telephone of the called party after a predetermined amount of coins have been deposited by a user.

4,698,841

METHODS OF ESTABLISHING AND TERMINATING CONNECTIONS IN A DISTRIBUTED-CONTROL BURST SWITCHING COMMUNICATIONS SYSTEM

E. Fletcher Haselton, Waltham, and Stanford R. Amstutz, Andover, both of Mass., assignors to GTE Laboratories, Incorporated, Waltham, Mass.

Filed Aug. 2, 1985, Ser. No. 762,590
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 379—269 **46 Claims**



1. A method of establishing a virtual connection between subscriber X, a calling party, and subscriber Y, a called party, in a burst-switching communications system having a plurality of subscribers wherein X and Y are coupled with ports of said system via line circuits and distributed-control means are coupled with ports of said system, said distributed-control means including first control means providing services to X and second control means providing services to Y, there being a first port address associated with X, a second port address associated with Y, a third port address associated with X's control means, and a fourth port address associated with Y's control means, said system having means for transmitting control bursts between said control means and means for transmitting communications between subscribers, said method comprising the steps of:

(a) detecting an off-hook condition on X's line and causing a dial tone to be applied to X's line, this step being performed by X's control means;

(b) detecting a digit of Y's directory number dialed on X's line and storing said digit in memory, this step being performed by X's control means;

(c) repeating step (b) for each digit dialed on X's line until the final digit of Y's directory address has been detected and stored, this step being performed by X's control means;

(d) looking-up Y's port address and Y's control means' port address based on Y's directory number, and transmitting a first control burst to Y's control means' inquiring whether Y's line is busy or idle, said first control burst including X's port address and X's control means port address, this step being performed by X's control means;

(e) detecting whether Y's line is busy or idle, transmitting a second control burst to X's control means indicating whether Y's line is busy or idle, and in the event Y's line is idle, causing a ring voltage to be applied to Y's line, this step being performed by Y's control means;

(f) in the event Y's line is busy, causing a busy signal to be applied to X's line, or in the event Y's line is idle, causing a ring-back signal to be applied to X's line, this step being performed by X's control means;

(g) detecting Y's off-hook condition and transmitting a third control burst to X's control means indicating Y's off-hook condition, this step being performed by Y's control means; and

(h) terminating said ring-back signal on X's line, this step being performed by X's control means, whereby a virtual connection has been established and full-duplex communi-

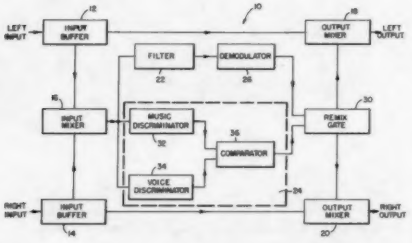
cations may occur between X and Y or others using their line(s).

4,698,842

AUDIO PROCESSING SYSTEM FOR RESTORING BASS FREQUENCIES

Gregory C. Mackie; Stephen E. Satra, and Chih-Ming Chen, all of Snohomish County, Wash., assignors to Electronic Engineering and Manufacturing, Inc., Lynnwood, Wash.

Filed Jul. 11, 1985, Ser. No. 754,518
Int. Cl.[4] H04R *5/00*; G10H *1/02*
U.S. Cl. 381—1 **11 Claims**



1. An audio processing system for recovering the low frequency fundamental component from left and right audio signals which contain a second harmonic of the fundamental component, comprising:

a first mixer receiving said left and right audio signals and generating a monaural signal at its output that is proportional to the sum of said left and right audio signals;

a band pass filter having its input connected to the output of said mixer, said band pass filter attenuating the frequency components of said monaural signal that are outside of a predetermined frequency range thereby generating a band pass filtered monaural signal;

a processing circuit connected to the output of said band pass filter, said processing circuit generating an output signal having a frequency that is half the frequency of a frequency component in said band pass filtered monaural signal;

a pair of second mixers receiving said left and right audio signals, respectively;

a switch having one of its terminals connected to said processing circuit and the other of its terminals connected to respective inputs of said second mixers, said switch applying the output signal from said processing means to said second mixers so that said second mixers generate respective output signals that are proportional to the sum of said processing circuit output signal and said left and right audio signals, said switch being selectively opened by a disable signal to remove said processing circuit output signal from said second mixer;

a differential circuit receiving said left and right audio signals and generating a differential signal at its output that is proportional to the difference between said left and said right audio signals; and

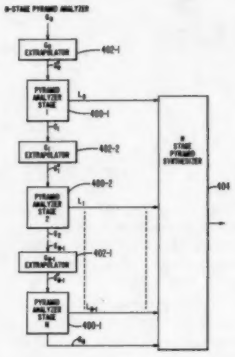
a comparator receiving said monaural signal from said first mixer and said differential signal from said differential circuit, said comparator generating said disable signal when said monaural signal has an amplitude that is greater than the amplitude of said differential signal by a predetermined value selected so that said disable signal is present when said left and right audio signals are vocally generated.

4,698,843

METHOD FOR COMPENSATING FOR VOID-DEFECTS IN IMAGES

Peter J. Burt, and Edward H. Adelson, both of Mercer County, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Aug. 19, 1985, Ser. No. 766,932
Int. Cl.[4] B06K *9/40*
U.S. Cl. 382—54 **3 Claims**



1. An image processing method for filling in at least one void defect in a relatively high-resolution sampled original image, wherein said image occupies a region of n-dimensional space, where n is an integer having a value of at least one, and said void defect is comprised of a plurality of contiguous zero-valued samples occupying a certain sub-region of said region, whereby the perimeter of said void sub-region forms a boundary between the zero-valued samples of said void sub-region and image-defining valued samples surrounding that void sub-region; and wherein said sampled original image in each dimension thereof has a given relatively high sample density; said method comprising the steps of:

(a) employing the image-defining valued samples surrounding said void sub-region to derive therefrom extrapolated-valued samples and replacing only those zero-valued samples that form the perimeter of said void sub-region with said extrapolated-valued samples, thereby to derive a modified image in which said void sub-region of zero-valued samples is reduced in size and the perimeter of said reduced-size void sub-region has a perimeter that is situated a single sample distance from the perimeter of said void sub-region prior to said replacement,

(b) low-pass filtering and sub-sampling said modified image to derive a lower resolution sampled image having a sample density in each dimension thereof which is one-half of that of said modified image.

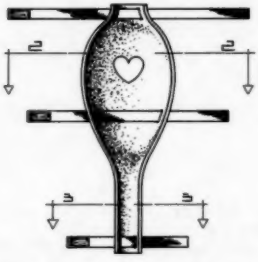
(c) substituting said lower resolution sampled image for said sampled original image and repeating steps (a) and (b) as many times as is required to derive a processed sampled image in which said void sub-region is completely filled in.

DESIGNS

OCTOBER 6, 1987

292,140
VEST WITH THERMALLY INSULATED COOLANT INSERTS
Bryan J. Cahill, 2831 E. White Star, Unit F, Anaheim, Calif. 92806, and Lonny R. Jones, P.O. Box 7192, Canyon Lake, Calif. 92380
Filed Nov. 1, 1984, Ser. No. 667,091
Term of patent 14 years
U.S. Cl. D2—184

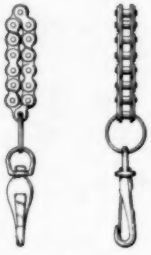
292,141
SHOE GUARD
Irmatine Cobb-Holloway, 8229 S. Kingston Ave., Chicago, Ill. 60617
Filed Jul. 25, 1985, Ser. No. 758,871
Term of patent 14 years
U.S. Cl. D2—314



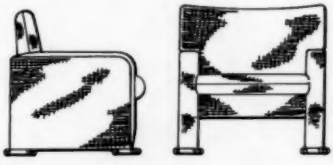
292,142
SHAPED CLEATED SOLE
Raymond F. Tonkel, Maryland Heights, and Robert J. Gamm, St. Louis, both of Mo., assignors to Kangaroos U.S.A., Inc., St. Louis, Mo.
Filed Jul. 2, 1984, Ser. No. 626,776
Term of patent 14 years
U.S. Cl. D2—320

292,143
UMBRELLA CAP
Julie A. Selig, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Nov. 2, 1984, Ser. No. 667,598
Term of patent 14 years
U.S. Cl. D3—17

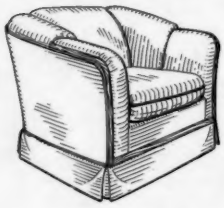
292,144
KEY HOLDER
David H. McClure, 245 Cambridge Ave., Elyria, Ohio 44035
Filed Apr. 16, 1984, Ser. No. 600,438
Term of patent 14 years
U.S. Cl. D3—65



292,145
SEAT
Otto W. Zapf, Konagstein, Fed. Rep. of Germany, assignor to Hauserman, Inc., Cleveland, Ohio
Filed Mar. 25, 1985, Ser. No. 715,957
Term of patent 14 years
U.S. Cl. D6—334

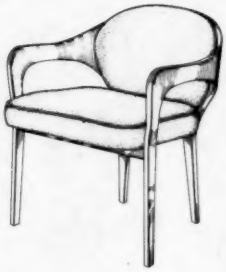


292,146
SEAT
Randy R. Culler, High Point, N.C., assignor to Sklar-Peppler, Inc., Ontario, Canada
Filed Sep. 26, 1986, Ser. No. 911,824
Term of patent 14 years
U.S. Cl. D6—334



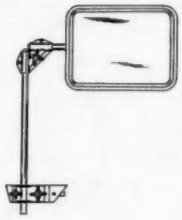
292,147
COLLAPSIBLE BAND STOOL
Philip R. Lomedico, and Craig MacKnight, both of 391 Rte. 304, Bardonia, N.Y. 10954
Filed Jan. 6, 1984, Ser. No. 568,481
Term of patent 14 years
U.S. Cl. D6—349

292,148
CHAIR
Paul R. Goldman, Andover, Mass., assignor to Plycraft Inc., Lawrence, Mass.
Filed Apr. 19, 1985, Ser. No. 725,358
Term of patent 14 years
U.S. Cl. D6—379

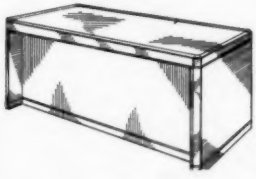


292,149
CHAIR
Mauro Monesi, S.Lazzaro di Savena, Italy, assignor to Castelli S.p.A., Bologna, Italy
Filed Dec. 5, 1984, Ser. No. 678,605
Claims priority, application Italy, Jun. 5, 1984, 53459/84[U]
Term of patent 14 years
U.S. Cl. D6—380

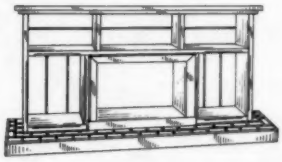
292,150
CHAIR ATTACHABLE TABLE AND SUPPORT ARM THEREFORE
Lars Restin, Bankgatan 8, and Sören Restin, S. Vägen 27, both of 46500 Nossebro, Sweden
Filed Jun. 4, 1984, Ser. No. 616,819
Claims priority, application Sweden, Dec. 8, 1983, 833260
Term of patent 14 years
U.S. Cl. D6—418



292,151
DESK
Robert B. Becker, North Salem, N.Y., assignor to Helikon Furniture Co., Inc, Taftville, Conn.
Filed Nov. 26, 1984, Ser. No. 674,582
Term of patent 14 years
U.S. Cl. D6—428

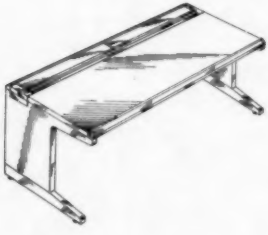


292,152
CABINET FOR FIREPLACE SIMULATION BURNER UNIT
Wayne E. Meyers, 401 N. Glen, West Chicago, Ill. 60185
Filed Jan. 2, 1985, Ser. No. 688,447
Term of patent 14 years
U.S. Cl. D6—450

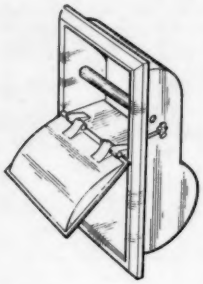


292,153
TRAY FOR A HOSPITAL BED
John J. Delaney, Sr., 8354 Benchmark Rd., Baldwinsville, N.Y. 13027
Filed Dec. 31, 1984, Ser. No. 687,960
Term of patent 14 years
U.S. Cl. D6—511

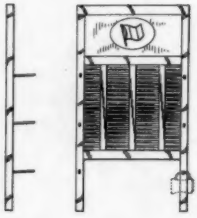
292,154
WORK TABLE OR SIMILAR ARTICLE
William R. Worrell, Hopkins, Minn., and Robert N. Laroche, Montreal, Canada, assignors to All-Steel Canada Ltd., Montreal, Canada
Filed Nov. 13, 1984, Ser. No. 670,038
Term of patent 14 years
U.S. Cl. D6—484



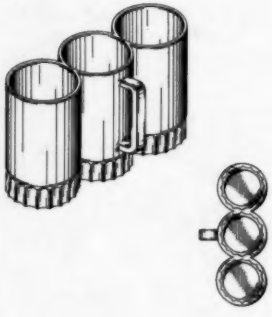
292,155
TOILET TISSUE DISPENSER
Edward T. Miels, 545-D Oakdale La., El Cajon, Calif. 92021
Filed Sep. 9, 1985, Ser. No. 773,947
Term of patent 14 years
U.S. Cl. D6—523



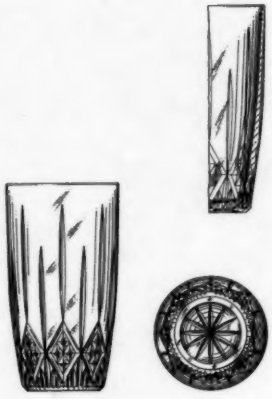
292,156
CUP HOLDER
Dennis D. Krol, 2020 Hunter Rd., Brighton, Mich. 48116
Filed Jan. 14, 1985, Ser. No. 690,983
Term of patent 14 years
U.S. Cl. D6—563



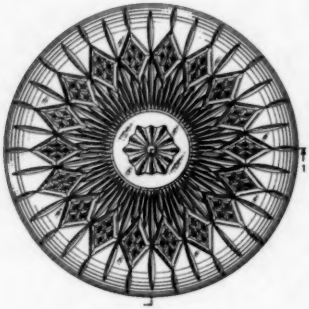
292,157
DRINKING MUG
Barry E. Robinson, 19040 N. 22nd St., Phoenix, Ariz. 85024
Filed Jul. 5, 1985, Ser. No. 752,038
Term of patent 14 years
U.S. Cl. D7—9

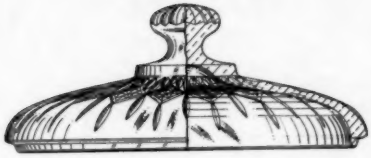


292,158
TUMBLER OR SIMILAR ARTICLE
James L. Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 613,465, May 24, 1984, Pat. No. Des. 287,560. This application Feb. 18, 1986, Ser. No. 833,767
Term of patent 14 years
U.S. Cl. D7—14



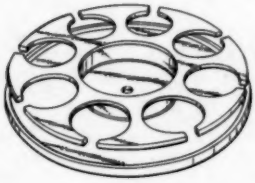
292,159
BOWL COVER OR SIMILAR ARTICLE
James L. Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 613,465, May 24, 1984, Pat. No. Des. 287,560. This application Mar. 13, 1986, Ser. No. 844,721
Term of patent 14 years
U.S. Cl. D7—40





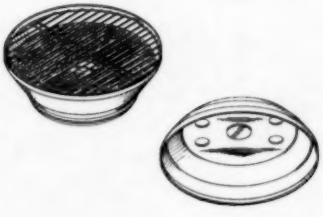
292,160
SOFT DRINK BOTTLE HOLDER
Michael J. Thomas, 524 Showalter, Midwest City, Okla. 73110
Filed Feb. 4, 1985, Ser. No. 697,620
Term of patent 14 years
U.S. Cl. D7—70

292,161
COCKTAIL TRAY
Tucker Spolter, 17 Broadway, Fairfax, Calif. 94930, and Gary J. Fullmer, 270 Angelita Ave., Pacifica, Calif. 94044
Filed Feb. 1, 1985, Ser. No. 697,181
Term of patent 14 years
U.S. Cl. D7—71

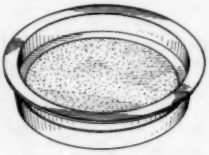


292,162
INSULATED JUG
Anso Zimmermann, Bad Hersfeld, Fed. Rep. of Germany, assignor to Rotpunkt Dr. Anso Zimmermann, Niederaula, Fed. Rep. of Germany
Division of Ser. No. 580,145, Feb. 14, 1984, Pat. No. Des. 287,805. This application Jan. 3, 1986, Ser. No. 815,866
Claims priority, application Fed. Rep. of Germany, Dec. 15, 1983, 8AR206/83
Term of patent 14 years
U.S. Cl. D7—317

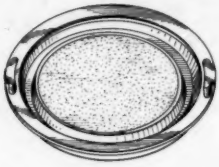
292,163
BARBECUE
James S. Mashburn, and Jerry P. Mashburn, both of 1201 E. Hill St., Long Beach, Calif. 90806
Filed Dec. 16, 1985, Ser. No. 809,142
Term of patent 14 years
U.S. Cl. D7—337



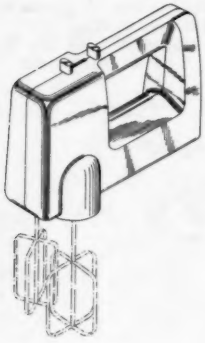
292,164
FRY PAN OR SIMILAR ARTICLE
Chang H. Oh, Kyung Ki Do, Rep. of Korea, assignor to J & L Importers, Inc., King of Prussia, Pa.
Filed Nov. 5, 1984, Ser. No. 668,339
Claims priority, application Rep. of Korea, Jun. 7, 1984, 6562
Term of patent 14 years
U.S. Cl. D7—354



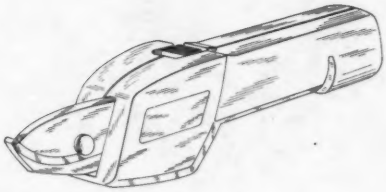
292,165
FRY PAN OR SIMILAR ARTICLE
Chang H. Oh, Kyung Ki Do, Rep. of Korea, assignor to J&L Importers, Inc., King of Prussia, Pa.
Filed Nov. 5, 1984, Ser. No. 668,403
Claims priority, application Rep. of Korea, May 28, 1984, 6119
Term of patent 14 years
U.S. Cl. D7—360



292,166
MIXER
Don R. McCloskey, Trappe, Md., assignor to Black & Decker, Inc., Towson, Md.
Filed Dec. 13, 1984, Ser. No. 681,426
Term of patent 14 years
U.S. Cl. D7—379

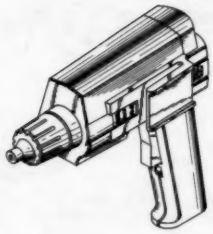


292,167
CORDLESS ELECTRIC PRUNER
Yann Le Gal, Lyons, France, assignor to Black & Decker Inc., Newark, Del.
Filed Oct. 10, 1985, Ser. No. 786,291
Claims priority, application France, Apr. 17, 1985, 85 1762
Term of patent 14 years
U.S. Cl. D8—5

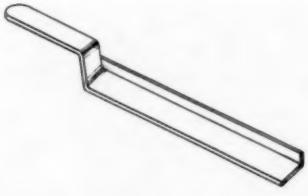


292,168
COMBINED FUSE HOLDER AND EXTRACTOR
Samuel M. Seltzer, and Saul Dennison, both of Livingston, N.J., assignors to Allison Corporation, Livingston, N.J.
Filed May 23, 1985, Ser. No. 737,238
Term of patent 14 years
U.S. Cl. D8—14

292,169
COMBINED HAND-HELD CORDLESS ELECTRIC DRILL AND HOLSTER THEREFOR
Lawrence E. House, II, and Robert I. Somers, both of Raleigh, N.C., assignors to Black & Decker, Inc.
Filed Aug. 31, 1984, Ser. No. 646,138
Term of patent 14 years
U.S. Cl. D8—68



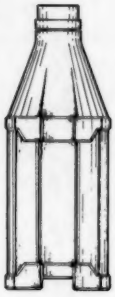
292,170
MAGNETIC HOLDER FOR SOCKETS
Jack C. Oates, 200 Lake Shore Dr., Easley, S.C. 29641
Filed Aug. 6, 1984, Ser. No. 638,644
Term of patent 14 years
U.S. Cl. D8—71



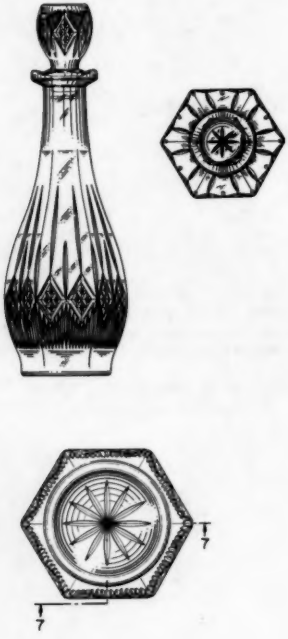
292,171
CABINET LATCH OR SIMILAR ARTICLE
Franco Berg, Isernhagen, Fed. Rep. of Germany, assignor to Rittal-Werk Rudolf Loh GmbH & Co. KG, Fed. Rep. of Germany
Filed Aug. 30, 1984, Ser. No. 645,608
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1984, 1MR351
Term of patent 14 years
U.S. Cl. D8—331

292,172
DEADBOLT LOCK FOR HINGED DOORS
Cardell E. Miller, Hudson, Wis., and Harvey F. Berg, Stacy, Minn., assignors to Ideal Security Hardware Corporation, St. Paul, Minn.
Filed Feb. 20, 1985, Ser. No. 703,274
Term of patent 14 years
U.S. Cl. D8—338

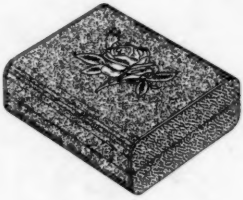
292,173
BOTTLE
Randall K. Julian, and David M. Wright, both of Evansville, Ind., assignors to Sunbeam Plastics Corporation, Evansville, Ind.
Filed Aug. 3, 1984, Ser. No. 637,494
Term of patent 14 years
U.S. Cl. D9—370



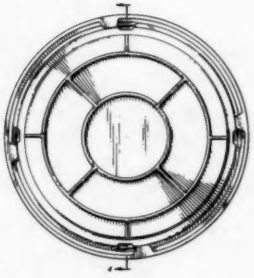
292,174
COMBINED DECANTER AND STOPPER OR SIMILAR ARTICLE
James L. Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation
Division of Ser. No. 613,465, May 24, 1984, Pat. No. Des. 287,560. This application Mar. 6, 1986, Ser. No. 841,993
Term of patent 14 years
U.S. Cl. D9—386



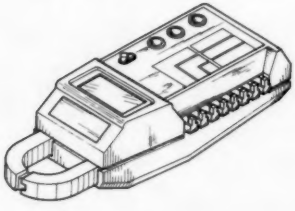
292,175
JEWELRY BOX
Philip Wolf, 35 Old Bond Street, London W1X 4PN, England
Filed Mar. 10, 1986, Ser. No. 842,416
Claims priority, application United Kingdom, Jan. 7, 1986, 1031421
Term of patent 14 years
U.S. Cl. D9—420



292,176
PIZZA BOX
Helmut Kuerti, Bedford, N.H., assignor to New England Tray, Ltd., Londonderry, N.H.
Continuation-in-part of Ser. No. 668,040, Nov. 5, 1984. This application Apr. 17, 1985, Ser. No. 724,629
Term of patent 14 years
U.S. Cl. D9—428

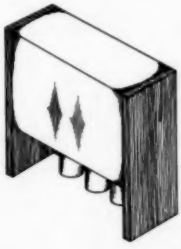


292,177
CLAMP-ON MULTIMETER OR SIMILAR ARTICLE
Lin Dong-Chang, No. 189, Min-Chaun W. Rd., Taipei, Taiwan
Filed Mar. 8, 1985, Ser. No. 709,818
Term of patent 14 years
U.S. Cl. D10—79



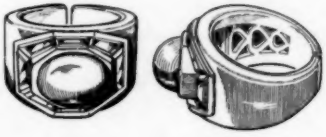
292,178
PORTABLE ALARM FOR A CHILD
Michael Yodsnukis, and Debra Yodsnukis, both of 524 Front St., Warrior Run, Pa. 18706
Filed Sep. 19, 1984, Ser. No. 652,196
Term of patent 14 years
U.S. Cl. D10—106

292,179
WALL CHIME
Monte L. Levin, New York, N.Y., assignor to Trine Manufacturing Corporation, New York, N.Y.
Filed Oct. 29, 1984, Ser. No. 665,598
Term of patent 14 years
U.S. Cl. D10—118



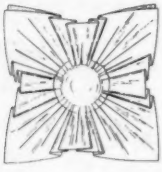
292,180
NECKLACE OR THE LIKE
David A. Seraile, 7201 Restgate Rd., New Orleans, La. 70127
Filed Dec. 27, 1985, Ser. No. 814,035
Term of patent 14 years
U.S. Cl. D11—11

292,181
RING
Marina Bulgari, Athens, Greece, assignor to Marina B Creation S.A., Vaduz, Liechtenstein
Filed May 9, 1985, Ser. No. 732,391
Claims priority, application Italy, Nov. 13, 1984, 36235/84[U]
Term of patent 14 years
U.S. Cl. D11—27

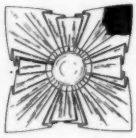


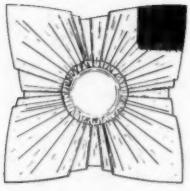
292,182
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 652,894
Term of patent 14 years
U.S. Cl. D11—164

292,183
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 653,016
Term of patent 14 years
U.S. Cl. D11—164



292,184
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 653,032
Term of patent 14 years
U.S. Cl. D11—164





292,185

FLOWER POT COVER

Donald E. Weder, Erwin H. Weder, both of Highland and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Mar. 29, 1985, Ser. No. 717,853

Term of patent 14 years

U.S. Cl. D11—164

292,186

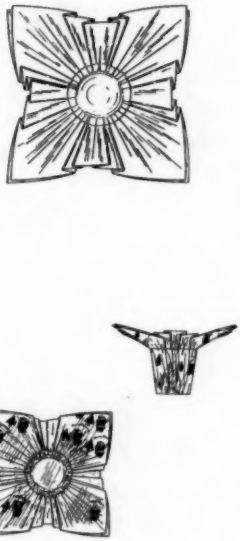
FLOWER POT COVER

Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

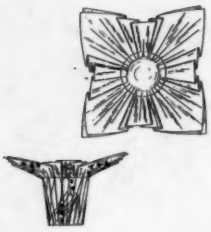
Continuation-in-part of Ser. No. 613,053, May 22, 1987. This application Mar. 29, 1985, Ser. No. 717,854

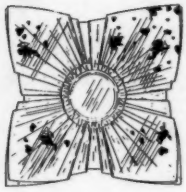
Term of patent 14 years

U.S. Cl. D11—164

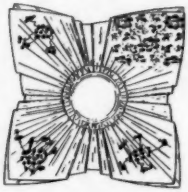


292,187
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, Ill., and Robert C. Abrams, Edwardsville, Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Mar. 29, 1985, Ser. No. 717,855
Term of patent 14 years
U.S. Cl. D11—164





292,188
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Mar. 29, 1985, Ser. No. 717,860
Term of patent 14 years
U.S. Cl. D11—164



292,189

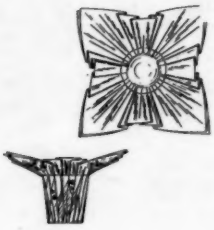
FLOWER POT COVER

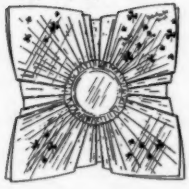
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Filed Mar. 29, 1985, Ser. No. 717,861

Term of patent 14 years

U.S. Cl. D11—164





292,190

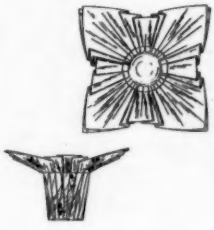
FLOWER POT COVER

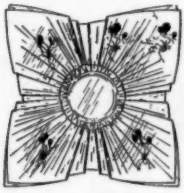
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Apr. 1, 1985, Ser. No. 718,279

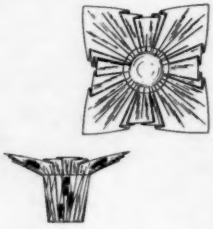
Term of patent 14 years

U.S. Cl. D11—164

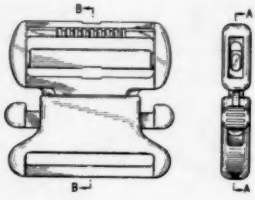




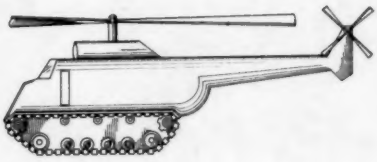
292,191
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Apr. 1, 1985, Ser. No. 718,488
Term of patent 14 years
U.S. Cl. D11—164



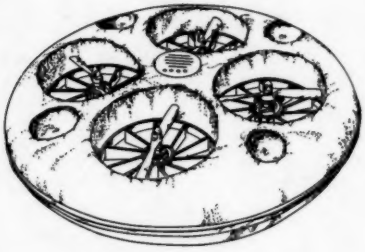
292,192
BELT BUCKLE
Kazumi Kasai, Namerikawa, Japan, assignor to Nippon Notion Kogyo Co. Ltd., Tokyo, Japan
Filed Mar. 18, 1985, Ser. No. 712,433
Term of patent 14 years
U.S. Cl. D11—216



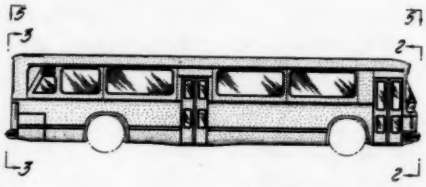
292,193
COMBINED HELICOPTER AND TANK
Anis I. Milad, 29-38 Yorkway, Baltimore, Md. 21222
Filed Jan. 11, 1985, Ser. No. 690,587
Term of patent 14 years
U.S. Cl. D12—2



292,194
AIRBORNE VEHICLE
Paul S. Moller, Dixon, Calif., assignor to Moller International, Inc., Davis, Calif.
Filed Mar. 19, 1985, Ser. No. 713,778
Term of patent 14 years
U.S. Cl. D12—5



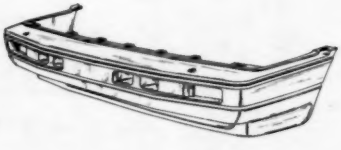
292,195
BUS BODY
Donald L. Manning, 4002 Normanwood Dr., Orchard Lake, Mich. 48033
Filed Feb. 21, 1985, Ser. No. 703,754
Term of patent 14 years
U.S. Cl. D12—84



292,196
TRAILER FOR CARRYING MEDICAL IMAGING EQUIPMENT
William D. Dooley, 8 Rivermont Dr., SW., Rome, Ga. 30161
Filed Dec. 24, 1984, Ser. No. 686,028
Term of patent 14 years
U.S. Cl. D12—97

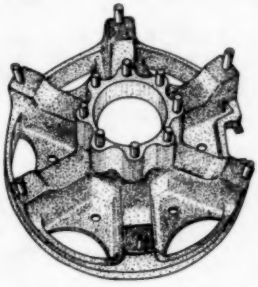
292,197
MOTORCYCLE TIRE
Kiyoshi Funahara, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed Jun. 4, 1985, Ser. No. 741,114
Claims priority, application Japan, Apr. 19, 1985, 60-16228
Term of patent 14 years
U.S. Cl. D12—146

292,198
AUTOMOBILE FRONT BUMPER
Norihiko Kawaoka, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Dec. 23, 1985, Ser. No. 812,857
Term of patent 14 years
U.S. Cl. D12—169

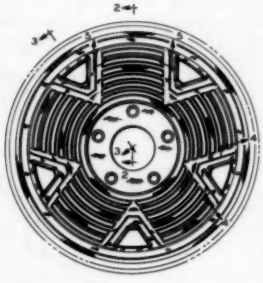


292,199
AIR STREAM SPOILER
James H. Thomas, 3012 S. Halliday, Santa Ana, Calif. 92705
Filed Jul. 2, 1984, Ser. No. 627,052
Term of patent 14 years
U.S. Cl. D12—181

292,200
VEHICLE WHEEL HUB
William E. Carmichael, Prince George, Canada, assignor to Morfee Industries Ltd., Vancouver, Canada
Filed Jul. 17, 1984, Ser. No. 631,841
Term of patent 14 years
U.S. Cl. D12—207

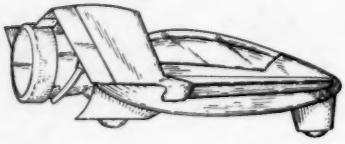


292,201
VEHICLE WHEEL CENTER
Donald J. Reid, Plymouth, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Aug. 12, 1985, Ser. No. 764,826
Term of patent 14 years
U.S. Cl. D12—211

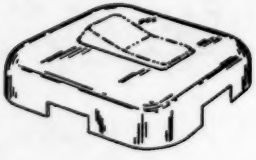


292,202
BOAT
Donald Eerdmans, P.O. Box 21, Hudsonville, Mich. 49426
Filed Sep. 11, 1986, Ser. No. 906,767
Term of patent 14 years
U.S. Cl. D12—302

292,203
AIRCRAFT
Karol C. Ligeti, 32 Ursa Street, North Balwyn, Victoria 3104, Australia
Filed Jul. 16, 1985, Ser. No. 755,488
Claims priority, application Australia, Mar. 28, 1983, 3351/83
Term of patent 14 years
U.S. Cl. D12—319

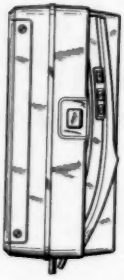


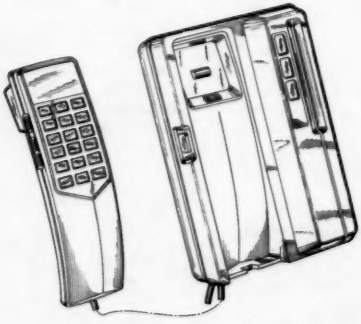
292,204
HOUSING FOR MODULAR ELECTRICAL SWITCH, RECEPTACLE DEVICE OR THE LIKE
Donald J. Booty, Sr., 521 Durham Dr., Frankfort, Ill. 60423, and Donald J. Booty, Jr., 360 E. Randolph Apt. 1603, Chicago, Ill. 60601
Filed Nov. 8, 1984, Ser. No. 669,604
Term of patent 14 years
U.S. Cl. D13—30



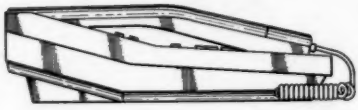
292,205
HEADPHONE
Fumitaka Kikutani, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Jan. 17, 1985, Ser. No. 692,218
Claims priority, application Japan, Jul. 25, 1984, 59-31060
Term of patent 14 years
U.S. Cl. D14—36

292,206
CREDIT CARD HANDSET TELEPHONE AND STAND INSTRUMENT
Katsuhito Watanabe, Warabe, Japan, assignor to Oki America, Inc., Norcross, Ga.
Filed Sep. 30, 1985, Ser. No. 782,076
Term of patent 14 years
U.S. Cl. D14—53

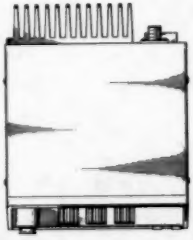




292,207
TELEPHONE SET
Mitsukazu Okuda, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Feb. 7, 1985, Ser. No. 699,023
Claims priority, application Japan, Aug. 7, 1984, 59-33541
Term of patent 14 years
U.S. Cl. D14—58

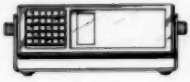


292,208
UNDER DASH TRANSCEIVER
John F. Fuhrman, Kansas City, Mo., assignor to Maxcom Electronics, Inc., Kansas City, Mo.
Filed Apr. 23, 1985, Ser. No. 726,334
Term of patent 14 years
U.S. Cl. D14—68



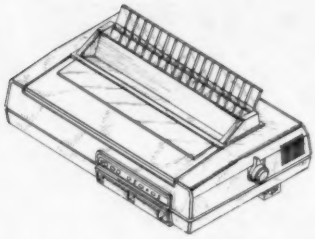
292,209
HAND HELD TRANSCEIVER
John F. Fuhrman, Kansas City, Mo., assignor to Maxcom Electronics, Inc., Kansas City, Mo.
Filed Apr. 23, 1985, Ser. No. 726,335
Term of patent 14 years
U.S. Cl. D14—68

292,210
MARINE TRANSCEIVER
Kazuyoshi Imazeki, Tokyo, Japan, assignor to General Research of Electronics, Inc., Tokyo, Japan
Filed Oct. 23, 1984, Ser. No. 663,848
Term of patent 14 years
U.S. Cl. D14—68

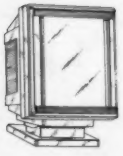


292,211
PORTABLE RADIO TRANSCEIVER
Kazuyoshi Imazeki, Tokyo, Japan, assignor to General Research of Electronics, Inc., Tokyo, Japan
Filed Feb. 27, 1985, Ser. No. 706,040
Term of patent 14 years
U.S. Cl. D14—68

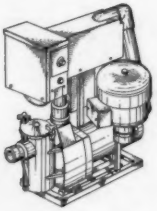
292,212
COMPUTER OUTPUT PRINTER
Masayoshi Eto; Hiroshi Hidaka; Kenzo Mio, and Yukio Terauchi, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Jun. 6, 1985, Ser. No. 742,154
Claims priority, application Japan, Dec. 7, 1984, 59-50333
Term of patent 14 years
U.S. Cl. D14—111



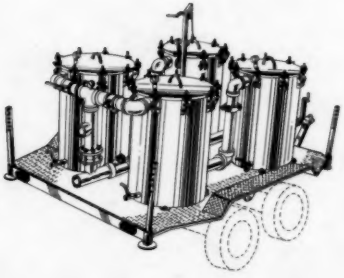
292,213
DATA DISPLAY TERMINAL
Shigeru Nezu, Tokyo, and Sakae Uematsu, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 28, 1985, Ser. No. 717,168
Term of patent 14 years
U.S. Cl. D14—113



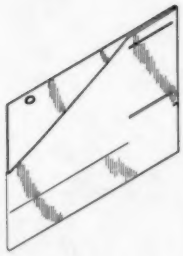
292,214
WATER PUMPING, HEATING AND AERATING MECHANISM FOR TUBS AND THE LIKE
James E. Kingston, Arlington, Wash., assignor to Hollibaugh Manufacturing Company, Inc., Marysville, Wash.
Filed Nov. 1, 1983, Ser. No. 547,820
Term of patent 14 years
U.S. Cl. D15—7

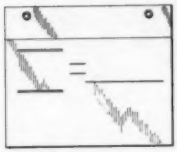


292,215
FLUID FILTRATION UNIT FOR USE IN OIL WELL HOLE DRILLING OPERATIONS
Leslie H. Bergh, 3130 Highway 30 West, Evanston, Wyo. 82930
Filed May 14, 1984, Ser. No. 609,634
Term of patent 14 years
U.S. Cl. D15—7



292,216
FRIDGE DOOR ORGANIZER
Roger St. Jacques, 21 Corleigh Drive, Nepean, Ontario, Canada
Filed Dec. 31, 1985, Ser. No. 814,979
Term of patent 14 years
U.S. Cl. D15—89

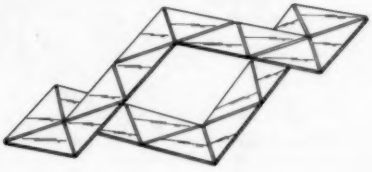




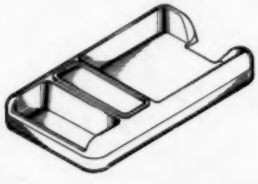
292,217
GUITAR
Rudolph J. Giron, III, 1674 Griffith Park Blvd., Los Angeles, Calif. 90026
Filed May 6, 1985, Ser. No. 730,597
Term of patent 14 years
U.S. Cl. D17—19

292,218
SUPPORT FOR TOM-TOM DRUMS
Donald T. Corder, Huntsville, Ala., assignor to Corder Enterprises, Inc., Huntsville, Ala.
Filed May 15, 1985, Ser. No. 734,075
Term of patent 14 years
U.S. Cl. D17—22

292,219
COLOR CHIP HOLDER
Timothy A. Zilka, 3443 Stoney Ridge Rd., Avon, Ohio 44011
Filed Jan. 3, 1985, Ser. No. 688,467
Term of patent 14 years
U.S. Cl. D19—59

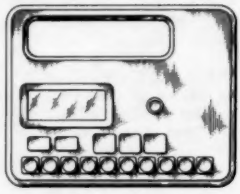


292,220
STATIONERY STAND FOR CONTAINING VISITING CARDS AND MEMOS
Lan-Hsiung Wen, No. 31, 8th Lin, Yun Nan Li, Hsin Pu Chen, Hsin Chu, Taiwan
Filed Oct. 16, 1984, Ser. No. 661,579
Term of patent 14 years
U.S. Cl. D19—92

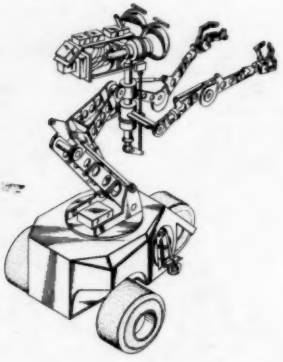


292,221
SCOOTER
Clifford F. Mueller, Arlington Heights, Ill., assignor to Schwinn Bicycle Company, Chicago, Ill.
Filed Dec. 19, 1986, Ser. No. 944,822
Term of patent 14 years
U.S. Cl. D21—81

292,222
TOY CALCULATOR
Carl M. Stern, Lawrenceville, N.J., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Jan. 23, 1985, Ser. No. 693,760
Term of patent 14 years
U.S. Cl. D21—111

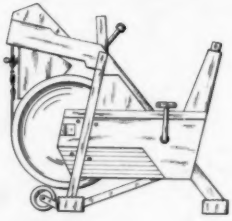


292,223
TOY ROBOT OR THE LIKE
Douglas Trumbull, Santa Monica, Calif., assignor to Showscan Film Corporation, Marina Del Rey, Calif.
Filed May 17, 1985, Ser. No. 735,329
Term of patent 14 years
U.S. Cl. D21—150



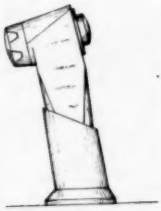
292,224
HAND CONTROL FOR A TOY ROBOT OR THE LIKE
Douglas Trumbull, Santa Monica, Calif., assignor to Showscan Film Corporation, Marina Del Rey, Calif.
Filed May 17, 1985, Ser. No. 735,328
Term of patent 14 years
U.S. Cl. D21—189

292,225
BICYCLE ERGOMETER BODY
Carl-Arne Breger, Malmo, Sweden, assignor to Monark AB, Sweden
Filed Sep. 5, 1985, Ser. No. 772,665
Term of patent 14 years
U.S. Cl. D21—194

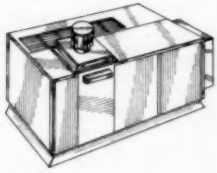


292,226
FAUCET HANDLE
Charles P. Hill, Indianapolis, and Anthony G. Spangler, Sheridan, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Dec. 6, 1985, Ser. No. 806,086
Term of patent 14 years
U.S. Cl. D23—252

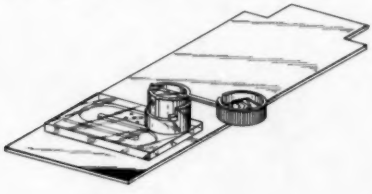
292,227
SINK SPRAYER
John Rudelick, Milwaukee, Wis., assignor to Universal-Rundle Corporation, New Castel, Pa.
Filed May 29, 1984, Ser. No. 614,671
Term of patent 14 years
U.S. Cl. D23—226



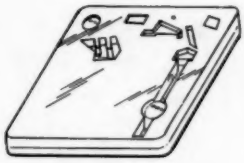
292,228
DOWN DISCHARGE HEATING AND COOLING UNIT
Leonard A. Framalin, 20790 W. Kennoway Cir., Birmingham, Mich. 48010
Filed Nov. 28, 1984, Ser. No. 675,481
Term of patent 14 years
U.S. Cl. D23—329



292,229
DISPOSABLE SENSOR CARD WITH RECEPTACLE AND ELECTRODE SENSORS FOR CHEMICAL ANALYSIS OF BIOLOGICAL FLUIDS
Mark B. Knudson, Arden Hills; Walter L. Sembrowich, Shoreview; Scott W. Carlson, Blaine; Richard L. Little, New Hope; Ronald E. Eibensteiner, Arden Hills, and Richard W. Baker, Anoka, all of Minn., assignors to Arden Medical Systems, Inc., Arden Hills, Minn.
Filed Jun. 21, 1984, Ser. No. 622,987
Term of patent 14 years
U.S. Cl. D24—21

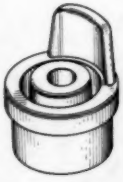


292,230
SAMPLE PROCESSOR CARD FOR USE IN CHEMICAL ANALYSIS APPARATUS
James T. Holen, Mundelein, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Mar. 19, 1985, Ser. No. 713,527
Term of patent 14 years
U.S. Cl. D24—22

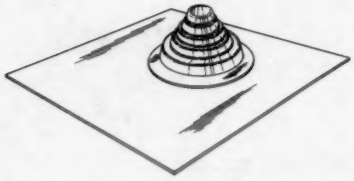


292,231
COMBINED NURSING BOTTLE SUPPORT AND HOLDER
Arthur M. Hudson, P.O. Box 23026, Oklahoma City, Okla. 73123
Filed Apr. 1, 1985, Ser. No. 718,534
Term of patent 14 years
U.S. Cl. D24—48

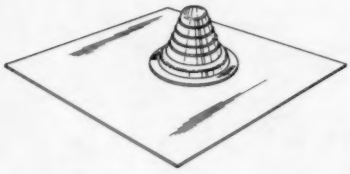
292,232
PROTECTIVE CLOSURE FOR A MEDICAL CONTAINER
Hugh M. Forman, Waukesha, Wis., and E. Thomas Yatsko, Royersford, Pa., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Oct. 12, 1984, Ser. No. 660,612
Term of patent 14 years
U.S. Cl. D24—51



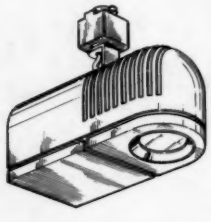
292,233
PIPE FLASHING
Werner E. Schalle, East Malvern, Australia, assignor to Aquarius Rubber Pty. Ltd., Scoresby, Australia
Filed Oct. 10, 1984, Ser. No. 659,453
Claims priority, application Australia, Apr. 19, 1984, 7248/84
Term of patent 14 years
U.S. Cl. D25—70



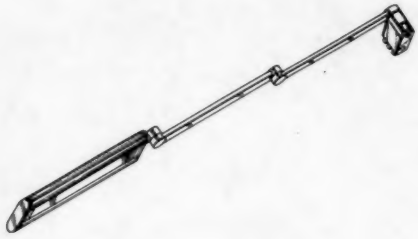
292,234
PIPE FLASHING
Werner E. Schalle, East Malvern, Australia, assignor to Aquarius Rubber Pty., Ltd., Scoresby, Australia
Filed Oct. 10, 1984, Ser. No. 659,538
Claims priority, application Australia, Apr. 19, 1984, 7249/84
Term of patent 14 years
U.S. Cl. D25—70



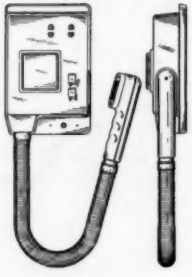
292,235
TRACK LIGHT FIXTURE
Scott Roos, 9052 N. Laramie, Skokie, Ill. 60077
Filed Feb. 27, 1984, Ser. No. 583,993
Term of patent 14 years
U.S. Cl. D26—65



292,236
LAMP
John W. Caldwell, 1829 Warwick Rd., San Marino, Calif. 91108
Filed Dec. 20, 1985, Ser. No. 811,634
Term of patent 14 years
U.S. Cl. D26—65



292,237
WALL-MOUNTED HAIR DRYER
Richard H. Rubin, Cape Town, South Africa, assignor to Panache Promotions (Proprietary) Limited, Athlone, South Africa
Filed Feb. 11, 1985, Ser. No. 700,658
Claims priority, application South Africa, Aug. 13, 1984, 84/0762
Term of patent 14 years
U.S. Cl. D28—12



292,238

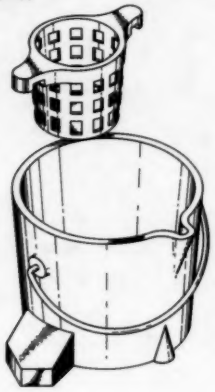
COMBINED MOP BUCKET AND WRINGER

Maria R. O'Brien, R.D. #2, Box 195, Montrose, Pa. 18801

Filed May 12, 1986, Ser. No. 862,517

Term of patent 14 years

U.S. Cl. D32—53



292,239

STEAM IRON

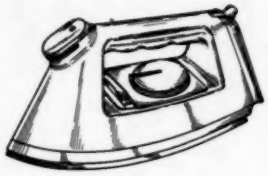
Franz A. Stützer, Offenbach am Main, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Jun. 6, 1985, Ser. No. 741,767

Claims priority, application Fed. Rep. of Germany, Dec. 6, 1984, 5 MR 10578

Term of patent 14 years

U.S. Cl. D32—70



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF OCTOBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Inc.: *See*—
Taylor, Chandler R., Jr.; and Lo, Young S., 4,698,430, Cl. 546-262.000.

Aalto, Erkki; and Yla-Hemmila, Veikko, to Halton Oy. Procedure and means for making the effect of gravity the same in flow regulators independent of the installation mode. 4,697,607, Cl. 137-1.000.

AB Volvo: *See*—
Janiszewski, Grzegorz K., 4,697,677, Cl. 192-48.910.

AB Volvo Penta: *See*—
Brandt, Lennart H., 4,698,036, Cl. 440-62.000.

Abbott, Richard C.; and Vydyanath, Honnavalli R., to Honeywell Inc. Liquid phase epitaxy slider/stator assembly having non-wetting growth well liners. 4,697,543, Cl. 118-412.000.

Abe, Kazuharu: *See*—
Okumura, Tsuguo; Yamagishi, Naomichi; Abe, Kazuharu; Sugiyama, Masayoshi; and Mori, Kenji, 4,698,195, Cl. 264-235.800.

Abe, Kunihiro; Matsumura, Yoshitake; and Morozumi, Takurou, to Fuji Jukogyo Kabushiki Kaisha. Ignition timing control system for an automotive engine. 4,698,765, Cl. 364-431.040.

Abe, Nobuhide; Adachi, Minoru; Ito, Makoto; and Uchida, Toshiya, to Kabushiki Kaisha Tamura Seisakusho. Method of and apparatus for controlling automatic soldering system. 4,698,774, Cl. 364-477.000.

Abe, Taizoh: *See*—
Tsukahara, Kengi; Matsui, Kazuma; Abe, Taizoh; and Suzuki, Masahiko, 4,697,991, Cl. 417-219.000.

Abell, Steven T., to Hewlett-Packard Company. Syntactic device for chain calculations. 4,698,784, Cl. 364-900.000.

Abo, Toshimi: *See*—
Ueno, Takashi; and Abo, Toshimi, 4,697,422, Cl. 60-602.000.

Abraham, Aleyamma. Portable cabinet for dispensing medication. 4,697,856, Cl. 312-305.000.

Abram, Trevor: *See*—
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.

Acme Resin Corporation: *See*—
Laitar, Robert A., 4,698,377, Cl. 523-143.000.

Adachi, Hideki: *See*—
Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, 4,697,916, Cl. 355-14.00E.

Adachi, Minoru: *See*—
Abe, Nobuhide; Adachi, Minoru; Ito, Makoto; and Uchida, Toshiya, 4,698,774, Cl. 364-477.000.

Adeka Argus Chemical Co., Ltd.: *See*—
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,698,381, Cl. 524-100.000.

Adell, Robert, to U.S. Product Development Company. Painted insulated metal edge guard and method. 4,697,327, Cl. 29-527.400.

Adelson, Edward H.: *See*—
Burt, Peter J.; and Adelson, Edward H., 4,698,843, Cl. 382-54.000.

Adolfsson, Rune: *See*—
Karlsson, Ove; Ostling, Sture; and Adolfsson, Rune, 4,697,937, Cl. 384-486.000.

Adolph Coors Company: *See*—
Hahn, Roger A.; and Heins, Henry H., 4,697,973, Cl. 414-330.000.

Advanced Magnetics, Inc.: *See*—
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,698,302, Cl. 435-94.000.

Advanced Micro Devices, Inc.: *See*—
Gershon, Eugen; and Sterner, Rudolph J., 4,698,523, Cl. 307-351.000.
Vazir-Zadeh, Yousef, 4,698,831, Cl. 377-117.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Lamalle, Jean; and Tijne, Jean-Louis, 4,698,011, Cl. 425-389.000.

Aerovox Incorporated: *See*—
MacDougall, Frederick W.; and Murphy, Thomas A., 4,698,725, Cl. 361-272.000.

AG fur Industrielle Elektronik AGIE: *See*—
Lothenbach, Michael; and Herzog, Peter, 4,698,475, Cl. 219-69.00W.

Agency of Industrial Science & Technology: *See*—
Haruta, Masatake; Sano, Hiroshi; and Kobayashi, Tetsuhiko, 4,698,324, Cl. 502-243.000.
Tao, Hiroaki, 4,698,314, Cl. 436-171.000.

Aghili, Hafez K., to McDermott International, Inc. Process for separating hydrocarbon gas constituents utilizing a fractionator. 4,698,081, Cl. 62-24.000.

Aida Engineering, Ltd.: *See*—
Sugawara, Masayoshi; Nakamura, Yuichi; and Matsui, Akira, 4,697,466, Cl. 74-27.000.

Air Products and Chemicals, Inc.: *See*—
Benander, Robert E.; and Holzl, Robert A., 4,698,244, Cl. 427-253.000.
Mao, Chung-Ling, 4,698,384, Cl. 524-458.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Hattori, Takemi; and Kawamura, Reiki, 4,697,848, Cl. 297-460.000.
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, 4,698,838, Cl. 379-58.000.
Kuno, Shozo, 4,697,678, Cl. 192-70.280.
Shiraki, Manabu; Amano, Hiroyuki; Nishimura, Tomoaki; and Shimizu, Katsumasa, 4,698,535, Cl. 310-156.000.

Aisin-Warner Kabushiki Kaisha: *See*—
Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, 4,697,474, Cl. 74-733.000.

Aisin-Warner Limited: *See*—
Hayakawa, Yoichi; Kawai, Masao; Yoshizawa, Kenichi; Harada, Yoshiharu; and Fukumura, Kagenori, 4,697,479, Cl. 74-867.000.

Aizawa, Iwao, to Hitachi, Ltd. Phase locked loop. 4,698,601, Cl. 331-1.00A.

Ajinkya, Milind B.: *See*—
Storey, William R.; Wheat, William R.; Smith, Stuart B.; and Ajinkya, Milind B., 4,698,211, Cl. 422-135.000.

Ajinomoto General Foods: *See*—
Okabe, Ryuichiro; and Yanagi, Yoshitaka, 4,697,503, Cl. 99-306.000.

Akashi, Akira: *See*—
Ohtaka, Keiji; Hiramatsu, Akira; Suda, Yasuo; Akashi, Akira; and Ishizaki, Akira, 4,698,492, Cl. 250-201.000.

Akiyama, Osamu, to Shimadzu Corporation. Monochromator. 4,697,924, Cl. 356-333.000.

Akzo NV: *See*—
Atkin, John, 4,698,155, Cl. 210-321.600.

Alas, Jacques; and Graton, Michel, to Valeo. Torsional damper device. 4,697,682, Cl. 192-106.200.

Albanesi, Giancarlo; and Rinaldi, Gianfranco, to Saffa S.p.A. Stabilized red phosphorus for use as flame-retardant, in particular for compositions on the basis of polymers. 4,698,215, Cl. 423-274.000.

Albano, Thomas: *See*—
Yacobucci, Paul D.; and Albano, Thomas, 4,698,391, Cl. 525-162.000.

Albert-Frankenthal AG: *See*—
Herb, Rudolf, 4,697,805, Cl. 270-47.000.

Albert Schrem Werkzeugfabrik GmbH: *See*—
Baur, Manfred, 4,697,966, Cl. 409-232.000.

Alcatel: *See*—
Denhez, Alain; Hargoaa, Francis; and Aubree, Jean, 4,698,826, Cl. 375-3.000.

Alcini, William V.; and Avery, Steven L., to General Motors Corporation. Refractory metal-lined induction coil. 4,698,473, Cl. 219-10.790.

Alder, Werner: *See*—
Amberg, Rudolf; and Alder, Werner, 4,697,921, Cl. 356-15.000.

Aldrich, Robert G.; Earl, Geoffrey H.; and Trunko, David W., to Halomet Inc. Process for making ferrite spherical particulate toner core from raw fly ash. 4,698,289, Cl. 430-106.600.

Aleshire, Rex A.: *See*—
Heys, George, Jr.; Aleshire, Rex A.; and Sampson, Harold J., 4,698,707, Cl. 360-99.000.

Alfa-Laval AB: *See*—
Wikholm, Bert S.; Carlsson, Torsten L. T.; and Oster, Ake R., 4,698,310, Cl. 435-316.000.

Alfa-Laval Separation AB: *See*—
Stroucken, Klaus, 4,698,053, Cl. 494-70.000.

Alklind, Lars E.; and Nilsson, Eric, to Regionala Stiftelsen i Varmland med firma Erress. Device comprising a mattress support. 4,697,290, Cl. 5-61.000.

Allan, James D., to Inmos Corporation. Source follower CMOS input buffer. 4,698,526, Cl. 307-475.000.

Allen, David O., to Allen Tool Company, Inc. Foil-lid combination for containers. 4,697,719, Cl. 220-258.000.

Allen Engineering Corporation: *See*—
Allen, J. Dewayne, 4,697,951, Cl. 404-110.000.

Allen. J. Dewayne, to Allen Engineering Corporation. Material spreader system. 4,697,951, Cl. 404-110.000.

Allen, Mark L. Handcuffs. 4,697,441, Cl. 70-16.000.

Allen Tool Company, Inc.: *See*—
Allen, David O., 4,697,719, Cl. 220-258.000.

Alliance Enamelsteel Corporation S.A.: *See*—
Palmans, Jos, 4,697,301, Cl. 15-426.000.

Alliance Pentagon A/S: *See*—
Prang, Jorgen S., 4,698,278, Cl. 428-314.400.

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Alongi, Anthony J.: *See—*
Alongi, Anthony V.; and Alongi, Anthony J., 4,698,634, Cl. 342-22.000.
Alongi, Anthony V.; and Alongi, Anthony J. Subsurface inspection radar. 4,698,634, Cl. 342-22.000.
Alps Electric Co., Ltd.: *See—*
Mizuta, Ken; and Kondo, Shiro, 4,698,571, Cl. 318-568.000.
Nakase, Koji; and Sasaki, Hiroaki, 4,698,490, Cl. 235-472.000.
Oba, Hiroki, 4,698,465, Cl. 200-16.00F.
Okuya, Tsutae, 4,698,613, Cl. 338-176.000.
Alsenz, Richard H. Refrigeration system having periodic flush cycles. 4,697,431, Cl. 62-225.000.
Alsthom: *See—*
Pham, Van Doan, 4,698,468, Cl. 200-148.00B.
Pham, Van Doan; and Thuries, Edmond, 4,698,469, Cl. 200-148.00E.
Altus, Mark, to 2500 Corporation, The. See-thru metallic food wrapper. 4,697,732, Cl. 229-87.00F.
Aluminum Company of America: *See—*
Ray, Siba P., 4,698,319, Cl. 501-87.000.
ALZA Corporation: *See—*
Gale, Robert M.; and Berggren, Randall, 4,698,062, Cl. 604-896.000.
Amano, Hiroyuki: *See—*
Shiraki, Manabu; Amano, Hiroyuki; Nishimura, Tomoaki; and Shimizu, Katsumasa, 4,698,535, Cl. 310-156.000.
Amatech Corporation: *See—*
Van Steenburg, Kip, 4,698,837, Cl. 378-208.000.
Amatsu, Masashi; Yanase, Takeyasu; Inoue, Hiroshi; and Nakagawa, Yusuke, to Fujitsu Limited. Magnetic bubble memory device. 4,698,786, Cl. 365-39.000.
AMAX Inc.: *See—*
Zibrida, John F., 4,698,163, Cl. 210-713.000.
Amazaki, Mitsuhiro: *See—*
Yoshikawa, Seiji; Sato, Isao; Nakayama, Shigenori; and Amazaki, Mitsuhiro, 4,697,498, Cl. 91-420.000.
Amberg Messtechnik AG: *See—*
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Amberg, Rudolf; and Alder, Werner, to Amberg Messtechnik AG. Device for detecting a relative change in distance between two measuring points, and its use. 4,697,921, Cl. 356-15.000.
American Can Company: *See—*
Murray, Lee J.; and Schaefer, Suzanne E., 4,698,247, Cl. 428-35.000.
American Cyanamid Company: *See—*
Blum, David M., 4,698,447, Cl. 568-12.000.
Giglia, Robert D.; and Clasen, Richard H., 4,698,256, Cl. 428-216.000.
Koroscil, Anthony, 4,698,183, Cl. 252-700.000.
American Cynamid Company: *See—*
Los, Marinus, 4,698,092, Cl. 71-92.000.
American Home Products Corporation: *See—*
Buzby, George C., Jr.; and Colatsky, Thomas J., 4,698,445, Cl. 564-86.000.
American Locker Group Incorporated: *See—*
Ellsberg, Thomas R., 4,698,630, Cl. 340-825.310.
American Microsystems, Inc.: *See—*
Bauer, Jerry R., 4,698,617, Cl. 380-28.000.
American Standard Inc.: *See—*
Bergmann, Konrad, 4,697,620, Cl. 137-625.170.
American Tank & Fabricating Co., The: *See—*
Youtt, Stanley A.; and Dixon, John W., 4,697,618, Cl. 137-587.000.
American Telephone and Telegraph Company: *See—*
McPherson, Ross; Smolik, Kenneth F.; and Thomson, David J., 4,698,769, Cl. 364-724.000.
American Telephone and Telegraph Company, AT&T Bell Laboratories: *See—*
Brandle, Charles D., Jr.; Fratello, Vincent J.; and Wolfe, Raymond, 4,698,820, Cl. 372-41.000.
Goldstein, Alan J.; and Nusser, Terry R., 4,698,752, Cl. 364-200.000.
Liuzzo, James G.; and Proetta, William J., 4,698,618, Cl. 340-365.00R.
American Telephone and Telegraph Company and AT&T Information Systems Inc.: *See—*
Goke, Louis R.; and Grimes, Gary J., 4,698,802, Cl. 370-60.000.
Ametek, Inc.: *See—*
Smith, Francis E.; Hyatt, Robert L.; and Kline, Leonard J., Jr., 4,698,534, Cl. 310-89.000.
Amoco Corporation: *See—*
Robeson, Lloyd M.; Harris, James E.; Kawakami, James H.; and Maresca, Louis M., 4,698,390, Cl. 525-133.000.
Amor, Max: *See—*
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,697,574, Cl. 128-1.00D.
AMP Incorporated: *See—*
Fisher, Robert L., Jr., 4,697,859, Cl. 439-246.000.
Galloway, Michael D.; Rose, William H.; and Shaffer, David T., 4,697,863, Cl. 439-544.000.
Hayes, Earl J.; Cooper, Ralph M.; Denlinger, Keith R.; and Shuey, John R., 4,697,864, Cl. 439-444.000.
Ryll, Jurgen H.; and Ullrich, Rainer W., 4,698,030, Cl. 439-752.000.
Amphenol Corporation: *See—*
Mitchell, Brian, 4,697,861, Cl. 439-271.000.
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., to BBC Brown, Boveri & Company, Limited. Liquid crystal display having degree of twist and thickness for improved multiplexing. 4,697,884, Cl. 350-334.000.
Amstutz, Stanford R.; Eliscu, Mark; and Haselton, E. Fletcher, to GTE Laboratories Incorporated. Link switch for a burst-switching communications system. 4,698,799, Cl. 370-58.000.
Amstutz, Stanford R.: *See—*
Haselton, E. Fletcher; Amstutz, Stanford R.; and Lenart, Joseph M., 4,698,803, Cl. 370-60.000.
Haselton, E. Fletcher; and Amstutz, Stanford R., 4,698,841, Cl. 379-269.000.
Amundson, David C.: *See—*
Lekholm, Anders; and Amundson, David C., 4,697,591, Cl. 128-419.0PG.
Anderson, Alma G., Jr.: *See—*
Gunter, William D., Jr.; Donaldson, Ralph W.; and Anderson, Alma G., Jr., 4,697,922, Cl. 356-28.500.
Anderson, Joseph C., to National Research Development Corporation. Siting a film onto a substrate including electron-beam evaporation. 4,698,235, Cl. 427-42.000.
Anderson, Kenneth W.; and Hickner, Richard A., to Dow Chemical Company, The. Cationic, advanced epoxy resin compositions. 4,698,141, Cl. 204-181.700.
Anderson, Martin, to Du Pont de Nemours, E. I., and Company. Pesticidal benzoylurea compounds. 4,698,365, Cl. 514-594.000.
Anderson, Richard N., to Hunter Douglas Inc. Tilting device for the ladder means of a venetian blind. 4,697,629, Cl. 160-177.000.
Ando, Toshinori: *See—*
Sueda, Tetsuo; and Ando, Toshinori, 4,698,511, Cl. 250-560.000.
Ando, Yasuhiko, to Teac Corportion. Rotary to linear converter for use in a flexible magnetic disk drive or the like. 4,697,467, Cl. 74-89.200.
Andreas, David W.: *See—*
Cox, David H.; and Andreas, David W., 4,698,472, Cl. 219-10.55E.
Andreasen, Norman H. Germination floor systems. 4,698,309, Cl. 435-302.000.
Andrei-Alexandru, Marcel; Kofink, Wolfgang; Schmid, Eckhardt; and Tietz, Volker, to SWF Auto-Electric GmbH. Adjusting device, especially for locking and unlocking motor vehicle doors. 4,698,560, Cl. 318-54.000.
Andress, Harry J., Jr.; and Ashjian, Henry, to Mobil Oil Corporation. Reaction products of alkenylsuccinic compounds with aromatic amines and lubricant compositions thereof. 4,698,169, Cl. 252-49.600.
Andrew Corporation: *See—*
Dyott, Richard B., 4,697,876, Cl. 350-96.290.
Andrew, Sydney P. S.; and Jennings, James R., to Imperial Chemical Industries PLC. Catalysts for ammonia synthesis. 4,698,325, Cl. 502-330.000.
Angerstein, Jorg; Mutz, Dieter; and Wagner, Elmar, to Telefunken Electronic GmbH. Optical system for providing a collimated light beam. 4,697,880, Cl. 350-247.000.
Angove, Richard D. Highway profile measuring device. 4,697,352, Cl. 33-523.000.
Annas, Dulin L., Sr.; and Teague, Richard M., to Anteg, Inc. Feeder bin. 4,697,857, Cl. 312-306.000.
Anstey, Henry D.; Frimml, Roger W.; and Frerich, Josef, to Deere & Company. Mechanism for feeding wrap material into a bale-forming chamber for enveloping a large round table. 4,697,402, Cl. 53-506.000.
Antchak, John R.: *See—*
Bytzek, Klaus K.; and Antchak, John R., 4,698,049, Cl. 474-135.000.
Anteg, Inc.: *See—*
Annas, Dulin L., Sr.; and Teague, Richard M., 4,697,857, Cl. 312-306.000.
Anthonijsz, Edwin M. C., to N.V. Lighttown Constructions. Water bicycle. 4,698,034, Cl. 440-27.000.
Anzai, Kazuo: *See—*
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; and Takano, Takeshi, 4,698,320, Cl. 501-96.000.
Aoki, Atsuhito, to Ryobi Limited. Clutch mechanism for use in fishing reels. 4,697,760, Cl. 242-220.000.
Aoki, Masami: *See—*
Okazaki, Kenichi; Morimoto, Kunio; Sawano, Kazumi; and Aoki, Masami, 4,698,755, Cl. 364-519.000.
Aoki, Tsuyoshi: *See—*
Kubota, Akihiro; Aoki, Tsuyoshi; Ono, Michio; and Sugiura, Rikio, 4,698,660, Cl. 357-70.000.
APD Cryogenics Inc.: *See—*
Longsworth, Ralph C.; and Steyert, William A., 4,697,635, Cl. 165-147.000.
Apert-Herzog Corporation: *See—*
Nichols, William E.; Herzog, William F.; Feldman, Neil; and Laumeister, William, 4,698,664, Cl. 358-10.000.
Aprica Kassai Kabushikikaisha: *See—*
Kassai, Kenzou, 4,697,823, Cl. 280-644.000.
Ara, Yoji, to Canon Kabushiki Kaisha. Wire dot printer with improved wire dot head. 4,697,939, Cl. 400-124.000.
Arad, Abraham A.: *See—*
Kennedy, Melvin R.; Nagel, Dietmar; and Arad, Abraham A., 4,698,044, Cl. 446-434.000.
Araghi, Mehdi N.; and Tandon, Jagdish C., to Xerox Corporation. Replaceable image sensor array. 4,698,131, Cl. 156-647.000.
Arai, Masakazu: *See—*
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.
Araki, Shoji: *See—*
Kakizaki, Takehiro; and Araki, Shoji, 4,698,558, Cl. 315-383.000.

Aramaki, Jun; Karashima, Toshiharu; Magara, Takuji; and Ushida, Minoru, to Mitsubishi Denki Kabushiki Kaisha. Electrical discharge machining apparatus with forced cooling system. 4,698,477, Cl. 219-69.00R.

Arasmith, Stanley D. Log chipping and flaking apparatus and method. 4,697,626, Cl. 144-373.000.

Arata, Ryozo: *See*—
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,698,381, Cl. 524-100.000.

Arc Technologies Systems Ltd.: *See*—
Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, 4,698,825, Cl. 373-93.000.

Arcair Company: *See*—
Henderson, Harold R.; and Mosinski, David, 4,697,791, Cl. 266-48.000.

Armand, Marie-Francoise; Daval, Jacques; Ferrand, Bernard; and Moriceau, Hubert, to Commissariat a l'Energie Atomique. Garnet-type magnetic material high faraday rotation magnetic film containing such a material and process for the production thereof. 4,698,281, Cl. 428-692.000.

Armco Inc.: *See*—
Chou, Yung-Sen, 4,697,828, Cl. 285-18.000.

Armitage, David, to United States of America, Air Force. Micromirror spatial light modulator. 4,698,602, Cl. 332-7.510.

Arney, Donald B. Inflatable float assembly and undercarriage for aircraft. 4,697,762, Cl. 244-101.000.

Arruda, Michael. Waste oil collection device. 4,697,670, Cl. 184-1.500.

Artzt, Peter; Rottmayr, Hans; and Bauer, Wolfgang, to Schubert & Salzer. Open-end spinning device. 4,697,411, Cl. 57-401.000.

Arzberger, Maximilian M.: *See*—
Bauer, Karlheinz; Haberer, Johann; and Arzberger, Maximilian M., 4,697,947, Cl. 403-14.000.

Arzouman, Harry H., to Safe-T-Jack, Inc. Means for automatically releasing a jack system. 4,697,788, Cl. 254-8.00B.

Asada, Eizi: *See*—
Suzuki, Osamu; Asada, Eizi; and Fukuoka, Tatsuhiko, 4,698,179, Cl. 252-511.000.

Asahi Glass Company, Ltd.: *See*—
Minowa, Toshio; Hashimoto, Tetsuro; Kuroda, Kohji; and Nakayama, Kazutaka, 4,697,885, Cl. 350-334.000.
Nakaya, Keiichi; Tanaka, Kunio; Kanno, Fukuo; and Kobayashi, Mitaka, 4,698,379, Cl. 523-513.000.
Ono, Yusuke; Ohotoshi, Sachio; and Yamauchi, Masaru, 4,698,240, Cl. 427-58.000.
Tsuchimoto, Yoshihiro; and Takesa, Kazuhiko, 4,697,615, Cl. 137-340.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Hayashi, Yoshiharu; and Kouji, Hiroyuki, 4,698,094, Cl. 71-108.000.

Asai, Shigeru: *See*—
Hayashi, Keijiro; Shinya, Kenzo; Saeki, Yasuo; and Asai, Shigeru, 4,697,820, Cl. 280-609.000.
Hayashi, Keijiro; Shinya, Kenzo; Awano, Toshimi; and Asai, Shigeru, 4,697,821, Cl. 280-609.000.

Asami, Fumitaka, to Fujitsu Limited. Output control circuit to prevent output of initial spike noise. 4,698,529, Cl. 307-542.000.

Asars, Juris A.: *See*—
Miller, Robert C.; and Asars, Juris A., 4,698,497, Cl. 250-231.00R.

Ashcroft, Andrew J., to National Research Development Corporation. Fluid flow control apparatus. 4,697,616, Cl. 137-486.000.

Ashjian, Henry: *See*—
Andress, Harry J., Jr.; and Ashjian, Henry, 4,698,169, Cl. 252-49.600.

Ashland Oil, Inc.: *See*—
Goel, Anil B.; and Richards, Harvey J., 4,698,408, Cl. 528-48.000.
Goel, Anil B., 4,698,409, Cl. 528-73.000.
Goel, Anil B.; and Richards, Harvey J., 4,698,416, Cl. 528-389.000.
Walters, Paul W.; Raiche, H. Anthony; Harness, Ronald L.; and Quodala, Genaro M., 4,698,212, Cl. 422-144.000.

Asmussen, Erik; and Munksgaard, Christian, to Bayer Aktiengesellschaft. Coating material for collagen-containing materials. 4,698,376, Cl. 523-115.000.

Aspden, Garth J.: *See*—
Chesworth, Graham; and Aspden, Garth J., 4,698,199, Cl. 376-206.000.

Astle, Brian, to RCA Corporation. Video apparatus and method for producing the illusion of motion from a sequence of still images. 4,698,682, Cl. 358-182.000.

Atkin, John, to Akzo NV. Method of and apparatus for continuous metered removal or addition of small quantities of fluid. 4,698,155, Cl. 210-321.600.

Atobe, Takashi: *See*—
Hirose, Haruomi; and Atobe, Takashi, 4,697,758, Cl. 242-84.10M.

Aubree, Jean: *See*—
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Augat Inc.: *See*—
Holt, Richard C., 4,698,275, Cl. 428-40.000.

Aumund-Fordererbau GmbH Maschinenfabrik: *See*—
Howe, Michael; and Schwarz, Waldemar, 4,697,696, Cl. 198-822.000.

Aupac Co., Ltd.: *See*—
Yoshida, Makoto, 4,698,538, Cl. 310-179.000.

Ausnit, Steven; and Van Erden, Donald L., to Minigrip, Inc. Quadruple profile plastic tubing for making bags. 4,698,274, Cl. 428-36.000.

Autoliv Development Aktiebolag: *See*—
Morner, Bengt O. J. S., 4,697,826, Cl. 280-804.000.

Automatic Fire Control, Inc.: *See*—
Kirschner, Kraig A., 4,697,770, Cl. 248-62.000.

Automotive Products plc: *See*—
Bancroft, Roger N., 4,697,685, Cl. 192-109.00R.
Maycock, Ian C.; and Crawford, Peter F., 4,697,684, Cl. 192-107.00R.

Avco Corporation: *See*—
Grant, William F.; Burt, Gary W.; and Kumnick, Albert J., 4,697,324, Cl. 29-419.00R.

Avery International Corporation: *See*—
Slobodkin, Yefim, 4,698,052, Cl. 493-355.000.

Avery, Steven L.: *See*—
Alcini, William V.; and Avery, Steven L., 4,698,473, Cl. 219-10.790.

Avtokombinat: *See*—
Gaydarov, Emanuil S.; Russev, Koytcho Y.; Paltchin, Vassil A.; and Stoilov, Ivan T., 4,698,462, Cl. 191-59.100.

Awano, Toshimi: *See*—
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Baba, Yoshihiko; and Yamaguchi, Masahiko, to Uniden Corporation. Radar detector. 4,698,632, Cl. 342-17.000.

Babcock, Stephen G.; Dyer, Gerald E.; and Gordon, Stephen S., to United States of America, National Aeronautics and Space Administration. Welding monitoring system. 4,698,484, Cl. 219-130.010.

Babcock Textilmaschinen GmbH: *See*—
Gottschalk, Karl-Heinz, 4,697,354, Cl. 34-23.000.

Babcock & Wilcox Company, The: *See*—
Keyes, Marion A., IV; and Shaffer, Jeremiah J., 4,697,980, Cl. 415-1.000.

Bachman, Thomas E.; McDavid, Larry S.; and Trueblood, David M., to Sensormedics Corporation. Gas monitor having trend indicators. 4,697,450, Cl. 73-23.000.

Baffi, Robert A.: *See*—
Wagner, Daniel B.; and Baffi, Robert A., 4,698,263, Cl. 428-402.200.

Baier, Walter F.: *See*—
Drago, Gary A.; Baier, Walter F.; Lee, Francis C.; Mills, Ross N.; and Mossbrugger, Horst G., 4,698,644, Cl. 346-140.00R.

Bailey, Kristy M.: *See*—
Cramm, Jeffrey R.; and Bailey, Kristy M., 4,698,404, Cl. 526-204.000.

Bailey, Richard B.; Joshi, Dilip K.; Michaels, Stephen L.; and Wisdom, Richard A., to Engenics, Inc. Production of lactic acid by continuous fermentation using an inexpensive raw material and a simplified method of lactic acid purification. 4,698,303, Cl. 435-139.000.

Bair, Thomas I., to Du Pont de Nemours, E. I., and Company. Copoly(p-phenylene terephthalamide/2,6-naphthalamide)aramid yarn. 4,698,414, Cl. 528-339.000.

Baitz, Guenter: *See*—
Ihlenburg, Rainer; Baitz, Guenter; and Nixdorf, Heinz, 4,698,709, Cl. 360-104.000.

Balaban, Alvin R.; and Steckler, Steven A., to RCA Corporation. Sync separator. 4,698,679, Cl. 358-153.000.

Balakrishnan, Ramanatha V., to National Semiconductor Corporation. Active bus backplane. 4,697,858, Cl. 439-61.000.

Balbinot, Renzo, to Nordica S.p.A. Footwear structure incorporating a heating device particularly for ski boots. 4,697,359, Cl. 36-2.600.

Balderson Inc.: *See*—
Duncan, Michael, 4,697,840, Cl. 294-119.400.

Baldoni, J. Gary: *See*—
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary; and Sarin, Vinod K., 4,698,266, Cl. 428-457.000.

Ban, Itsuki. Semiconductor electric motor having a rotary transformer to excite a rotor. 4,698,563, Cl. 318-254.000.

Ban, Megumu, to Toyota Jidosha Kabushiki Kaisha. Structure for mounting engine auxiliaries. 4,697,782, Cl. 248-639.000.

Bancroft, Roger N., to Automotive Products plc. Clutch cover assembly. 4,697,685, Cl. 192-109.00R.

Band, Elliot I.; and Summers, William E., III, to Stauffer Chemical Company. Transition metal catalyst component containing magnesium alkoxy alkoxides. 4,698,323, Cl. 502-133.000.

Bandlish, Baldev K.: *See*—
Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., 4,698,380, Cl. 524-2.000.

Bando Kiko Co., Ltd.: *See*—
Bando, Shigeru, 4,698,088, Cl. 65-174.000.

Bando, Shigeru, to Bando Kiko Co., Ltd. Glass plate fabrication machine under automatic control. 4,698,088, Cl. 65-174.000.

Banno, Tutomu: *See*—
Kosaka, Minoru; and Banno, Tutomu, 4,698,695, Cl. 358-338.000.

Bar-Cohen, Yoseph, to McDonnell Douglas Corporation. Broad band acoustic transducer. 4,698,541, Cl. 310-326.000.

Barbaro, Maria: *See*—
Bertini, Vincenzo; Marabini, Anna; De Munno, Angela; Barbaro, Maria; and Pocci, Marco, 4,698,171, Cl. 252-60.000.

Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., to International Business Machines Corp. Definition of line unit size. 4,698,624, Cl. 340-709.000.

Barker, Irvy T., to Nelson Industries Inc. Aspirating muffler. 4,697,668, Cl. 181-262.000.

Barker, Robert A.; Tsai, Chuang C.; and Knights, John C., to Xerox Corporation. Controlled isotropic doping of semiconductor materials. 4,698,104, Cl. 437-141.000.

Barkley, Vincent P.; and Siegel, William J., to Pace Incorporated. Heater device. 4,698,485, Cl. 219-228.000.

Barmag AG: *See*—
Lenk, Erich; and Feth, Max, 4,698,008, Cl. 425-192.00S.
Schippers, Heinz; Gerhartz, Seigmar; and Kalthoff, Rolf, 4,697,753, Cl. 242-18.100.

Barnes, John: *See*—
Flannagan, Stephen T.; Reed, Paul A.; and Barnes, John, 4,698,788, Cl. 365-205.000.

Barnett, Ronald E.; Zanno, Paul R.; and Roy, Glenn M., to General Food Corporation. Sweetening with L-aminodicarboxylic acid amides. 4,698,231, Cl. 426-548.000.

Barr, Harold B. Continuously variable transmission. 4,697,477, Cl. 74-793.000.

Barr, John D.; and Taylor, Malcolm R., to NL Petroleum Products Limited. Rotary drill bits. 4,697,654, Cl. 175-329.000.

Barzilai, Zeev; Iyengar, Vijay S.; and Silberman, Gabriel M., to International Business Machines Corporation. Shift register latch arrangement for enhanced testability in differential cascode voltage switch circuit. 4,698,830, Cl. 377-19.000.

BASF Aktiengesellschaft: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Hettche, Albert; Schneider, Rolf; and Raubenheimer, Hans-Juergen, 4,698,174, Cl. 252-174.240.
Graf, Fritz; and Hupfer, Leopold, 4,698,434, Cl. 548-342.000.
Straehle, Wolfgang; Marx, Matthias; and Schuett, Uwe, 4,698,410, Cl. 528-76.000.
Werner, Frank; Marx, Matthias; and Schmidt, Hans U., 4,698,371, Cl. 521-131.000.

Bassett, Gregory S.; and Bollman, Robert L., to Eli Lilly and Company. Bolus assembly apparatus. 4,698,116, Cl. 156-423.000.

Batra, Tarsaim L.: *See*—
Joy, Richard C.; and Batra, Tarsaim L., 4,697,332, Cl. 437-29.000.

Bauer, Jerry R., to American Microsystems, Inc. ROM Protection scheme. 4,698,617, Cl. 380-28.000.

Bauer, Karlheinz; Haberer, Johann; and Arzberger, Maximilian M., to Karl Bauer Spezialtiefbau GmbH & Co. KG. Plug connection for boring tubes. 4,697,947, Cl. 403-14.000.

Bauer, Wolfgang: *See*—
Artzt, Peter; Rottmayr, Hans; and Bauer, Wolfgang, 4,697,411, Cl. 57-401.000.

Baur, Bruce K.; and Meigs, Gordon W., to Tektronix, Inc. Power amplifiers for driving inductive loads. 4,698,559, Cl. 315-408.000.

Baur, Manfred, to Albert Schrem Werkzeugfabrik GmbH. Pressurized clamp for securing tools or workpieces. 4,697,966, Cl. 409-232.000.

Baxter Travenol Laboratories, Inc.: *See*—
Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., 4,698,207, Cl. 422-46.000.
Forkner, John F., 4,697,577, Cl. 128-6.000.
Link, William T., 4,697,596, Cl. 128-681.000.
Makaryk, Walter A.; Dudar, Thomas E.; and Zentz, Mary K., 4,698,061, Cl. 604-408.000.

Bayer Aktiengesellschaft: *See*—
Asmussen, Erik; and Munksgaard, Christian, 4,698,376, Cl. 523-115.000.
Beck, Gunther; Reinecke, Paul; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,698,357, Cl. 514-370.000.
Burow, Wilfried; Printzen, Helmut; Brunn, Horst; and Nollen, Klaus, 4,698,100, Cl. 106-304.000.
Engbert, Theodor; Knofel, Hartmut; and Wegener, Gerhard, 4,698,424, Cl. 544-222.000.
Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.
Meyer, Rolf-Volker; Kreuder, Hans-Joachim; and Hohl, Erwin, 4,698,426, Cl. 544-253.000.
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.
Straub, Otto C., 4,698,221, Cl. 424-89.000.

Bayer, Eric W., to General Electric Company. High-temperature laminated insulating member. 4,698,277, Cl. 428-141.000.

BBC Brown, Boveri & Company, Limited: *See*—
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., 4,697,884, Cl. 350-334.000.

Beasley, James E.; and Lindsey, Steven M., to Hughes Aircraft Company. Bi-directional current switch. 4,698,521, Cl. 307-270.000.

Beaumont, Richard J.: *See*—
Fry, Richard L.; and Beaumont, Richard J., 4,698,692, Cl. 358-299.000.

Beaverson, Gregory K., to RCA Corporation. Apparatus and method for correcting CCD pixel nonuniformities. 4,698,685, Cl. 358-213.150.

Beck, Gunther; Reinecke, Paul; Paulus, Wilfried; and Schmitt, Hans-Georg, to Bayer Aktiengesellschaft. 2,4-dichloro-5-nitro-thiazole. 4,698,357, Cl. 514-370.000.

Beck, Willi K.; and Danielson, Lincoln V., to Joseph Pollak Corporation. Automotive switch. 4,698,466, Cl. 200-61.780.

Becker, Benedikt: *See*—
Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.

Becker, Paul: *See*—
Jansons, Viktors; Gors, Heinrich C.; Moore, Stephen; Reamey, Robert H.; and Becker, Paul, 4,698,393, Cl. 525-242.000.

Becker, Rudiger; Clement, Albrecht; Virgilio, Gustav; and Weller, Hugo, to Robert Bosch GmbH. Method of controlling the operation of an automotive internal combustion engine. 4,697,563, Cl. 123-421.000.

Becton, Dickinson and Company: *See*—
Grippi, Nicholas A., 4,697,717, Cl. 215-354.000.
Schwartz, Abraham; Williams, Joel; and Stevens, Robert D., 4,698,262, Cl. 428-402.000.
Wagner, Daniel B.; and Baffi, Robert A., 4,698,263, Cl. 428-402.200.

Bednorz, Johannes G.; Gimzewski, James K.; and Reihl, Bruno, to International Business Machines Corporation. Field-emission scanning auger electron microscope. 4,698,502, Cl. 250-306.000.

Behnke, Klaus; and Munzenbrock, Anton, to Mannesmann Aktiengesellschaft. Hoist with overload safety protection. 4,698,565, Cl. 318-318.000.

BEI Electronics, Inc.: *See*—
Kimble, Jack, 4,698,608, Cl. 335-222.000.

Beierwaltes, Craig G.: *See*—
Wensel, Neil D.; Norris, Gary E.; and Beierwaltes, Craig G., 4,698,767, Cl. 364-471.000.

Beisel, Robert R.: *See*—
Stevens, Raymond R., Jr.; Beisel, Robert R.; and Griffiths, Stephen F., 4,697,448, Cl. 72-405.000.

Beitinger, Eberhard: *See*—
Nussbaumer, Manfred; Glaser, Eberhard; Beitinger, Eberhard; and Eckardt, Hartmann, 4,697,953, Cl. 405-128.000.

Bekedam, Martin. Atmospheric deaerator unit. 4,698,076, Cl. 55-164.000.

Bell & Howell Company: *See*—
Hertel, Heinz E., 4,697,919, Cl. 355-27.000.
Rattan, Dev R.; and Parker, Robert R., 4,698,770, Cl. 364-900.000.

Bell, Raymond W. H., to Dunlop Limited a British Company. Flexible, flame-retardant polyurethane foams. 4,698,369, Cl. 521-99.000.

Bell Telephone Laboratories, Incorporated: *See*—
McPherson, Ross; Smolik, Kenneth F.; and Thomson, David J., 4,698,769, Cl. 364-724.000.

Belot, Dominique; Rade, Jean-Yves; Piffard, Jean-Francois; Larquet, Christian; and Cornut, Philippe, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process and the apparatus for the production of silicon hydrides. 4,698,218, Cl. 423-347.000.

Ben-Jac, Inc.: *See*—
Kenny Sr., Patrick M., 4,697,958, Cl. 405-228.000.

Benander, Robert E.; and Holzl, Robert A., to Air Products and Chemicals, Inc. Deposition of titanium aluminides. 4,698,244, Cl. 427-253.000.

Benecke, Herman P.: *See*—
Sinclair, Richard G.; Benecke, Herman P.; and Sowell, Sylvester, 4,698,415, Cl. 528-388.000.

Benedick, Edward H., to Regenerative Environmental Equip. Co., Inc. Retaining wall with heat exchange characteristics for thermal regeneration. 4,697,531, Cl. 110-336.000.

Bengl, Dieter; and Horres, Johannes, to Grunzweig & Hartmann und Glasfaser AG. Apparatus for producing mineral fibres from silicate raw materials such as basalt, in particular by blast drawing. 4,698,085, Cl. 65-16.000.

Benninger AG: *See*—
Kofler, Wilhelm, 4,697,756, Cl. 242-67.10R.

Benton, Terry L.: *See*—
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,697,499, Cl. 92-151.000.

Beppu, Yoshitugu: *See*—
Ikeda, Toshiki; Beppu, Yoshitugu; Yamamoto, Takashi; Ishigaki, Hideyo; and Ohmura, Hiroshi, 4,698,367, Cl. 521-57.000.

Beretta, Pier G., to Fabrica d'Armi P.Beretta S.p.A. Tripping mechanism for the conversion closed-bolt automatic rifles to open-bolt ones. 4,697,495, Cl. 89-143.000.

Berg, Lloyd. Separation of isopropyl acetate from isopropanol by extractive distillation. 4,698,137, Cl. 203-51.000.

Berggren, Randall: *See*—
Gale, Robert M.; and Berggren, Randall, 4,698,062, Cl. 604-896.000.

Berglund, Robert K.; Mautz, Karl E.; and Tyldesley, Roger, to Motorola, Inc. Sloped contact etch process. 4,698,128, Cl. 156-643.000.

Bergmann, Konrad, to American Standard Inc. Sanitary valve assembly. 4,697,620, Cl. 137-625.170.

Bergsten, Arvid H. Folding portable tree step. 4,697,669, Cl. 182-92.000.

Bergstrand, Gunnar, to Moveco System AB. Rotary mechanism. 4,697,468, Cl. 74-105.000.

Berkes, John S., to Xerox Corporation. Process for energy reduction with flash fusing. 4,698,290, Cl. 430-124.000.

Bermond, Gabriele; and Vignotto, Angelo, to RIV-SKF Officine Di Villar Perosa S.p.A. Bearing with reinforced and vented seal. 4,697,936, Cl. 384-484.000.

Bernard, Thomas E.; Roth, Emile M; Mohan, Edwin R.; Sherwin, Gary W.; and Zomp, John M., to Westinghouse Electric Corp. Evoked potential autorefractometry system. 4,697,598, Cl. 128-731.000.

Bernhardt, Siegfried; and Schmidgen, Hans. Apparatus for the manufacture of a nonwoven fabric. 4,697,311, Cl. 19-161.100.

Bernitz, Bernhard; Brodmann, Richard; and Hermann, Dietmar, to Continental Gummi-Werke Aktiengesellschaft. Method and apparatus for producing sealing strips and similar profiled strips of rubber and rubber-like elastomers. 4,698,193, Cl. 264-171.000.

Bertini, Vincenzo; Marabini, Anna; De Munno, Angela; Barbaro, Maria; and Pocci, Marco, to Consiglio Nazionale Delle Ricerche. Syn-

thetic organic polymers for the selective flocculation of titanium and iron ores. 4,698,171, Cl. 252-60.000.

Bertocchi, Giuseppe, to International Standard Electric Corporation. Device for pulse modulation automatic control. 4,698,637, Cl. 342-399.000.

Beruvides, Mario, to Waynesboro Textiles. Anticocking high torque removal closure assembly. 4,697,715, Cl. 215-330.000.

Besecke, Siegmund: *See*—
Ude, Werner; Besecke, Siegmund; Riemann, Achim; and Schroeder, Guenther, 4,698,448, Cl. 568-14.000.

Bespalova, Zhanna D.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

Bessonneau, Guy; Carnez, Bernard; Derewonko, Henry; and Lepage, Joel, to Thomson-CSF. Encapsulating box for a power semiconductor with improved input-output insulator. 4,698,661, Cl. 357-74.000.

Betensky, Ellis I., to U.S. Precision Lens, Inc. Projection lens. 4,697,892, Cl. 350-432.000.

Betz Laboratories, Inc.: *See*—
Moreland, Robert D., 4,698,133, Cl. 162-5.000.

Bevan, Robert: *See*—
Mead, James B.; Bevan, Robert; and Schwartz, Leonard, 4,698,639, Cl. 343-756.000.

Beyer, Dietmar: *See*—
Muller, Hartwig; Hellwig, Claus; and Beyer, Dietmar, 4,697,438, Cl. 66-75.200.

BF Goodrich Company, The: *See*—
Lai, John T.; and Son, Pyong N., 4,698,446, Cl. 564-494.000.

Bhadriraju, Nataraj, to GTE Communication Systems Corporation. RAM memory overlay gate array circuit. 4,698,749, Cl. 364-200.000.

Bhowmik, Anup; and McMullin, Wayne A., to Rockwell International Corporation. Efficiency enhanced free electron laser. 4,698,815, Cl. 372-2.000.

Biche, Michael R.: *See*—
Koch, George R.; Krolak, Michael; and Biche, Michael R., 4,698,775, Cl. 364-478.000.

Bidwell, Christopher A.: *See*—
Chrisman, Charles L.; Bidwell, Christopher A.; and Libey, George S, 4,697,546, Cl. 119-3.000.

Billet, Rene ; Mousston, Roland; and Bionaz, Jean, to Valeo. Torsional damping device having wide range clearance, and a hydraulic coupling having such a torsional damping device, in particular for a motor vehicle. 4,697,417, Cl. 60-338.000.

Billet, Rene ; Rumignani, Paolo; and Chasseguet, Gustave, to Valeo. Torsional damper with intermediate member for rendering springs inoperative at low torque. 4,698,045, Cl. 464-68.000.

Billner, Werner, to Schubert & Salzer. Open-end spinning device. 4,697,410, Cl. 57-401.000.

Billstein, Herbert H. Crane load-test gauge. 4,697,458, Cl. 73-862.000.

Bionaz, Jean: *See*—
Billet, Rene ; Mousston, Roland; and Bionaz, Jean, 4,697,417, Cl. 60-338.000.

Birdwell, Jeffrey D.: *See*—
Carl, William P.; and Birdwell, Jeffrey D., 4,698,243, Cl. 427-341.000.

Bjorck, Conny; and Sigurdsson, Per A., to Sicomant AB Juteskarsgatan 38. Method of finely crushing particles of material in an impact mill and apparatus for performing the method. 4,697,743, Cl. 241-5.000.

Blackwelder, Ron F.; Gad-el-Hak, Mohamed; and Srnsky, Randy A., to Flow Industries, Inc. Method and apparatus for controlling bound vortices in the vicinity of lifting surfaces. 4,697,769, Cl. 244-199.000.

Blair, Leslie M.; and Conrad, Roddy M., to Du Pont de Nemours, E. I., and Company. Process for making n-butyl methacrylate. 4,698,440, Cl. 560-205.000.

Blaisdell, Charles T.; Cordes, Walter J.; Heinsohn, George E.; Kook, John F.; and Kosak, John R., to Du Pont de Nemours, E. I., and Company. Process for the preparation of methyl carbamates and thioimidates. 4,698,438, Cl. 558-3.000.

Blanc, Michel; Pollard, Jean; Marchand, Gerard; and Henri, Rene . Multi-directional non-imaging radiations concentrator and/or deconcentrator device. 4,697,867, Cl. 350-96.100.

Blankenship, Johnny E.: *See*—
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.

Blankenship, Timothy L.; and Nolan, Joseph G., III, to Harris Corporation. Test circuitry for testing fuse link programmable memory devices. 4,698,589, Cl. 324-158.00R.

Blanz, Rolanz, to Graubremse GmbH. Control arrangement for raising and lowering the vehicle body of air-suspended vehicles. 4,697,822, Cl. 280-6.00H.

Bloom, Leslie E., to VSP, Inc. Interlace/non-interlace data converter. 4,698,674, Cl. 358-140.000.

Bloxom, Ingrid B., Jr. Method for colonic and intestinal irrigation. 4,698,054, Cl. 604-54.000.

Bloyet, Emile: *See*—
Leprince, Philippe; Marec, Jean; Saada, Serge; Bloyet, Emile; and Migne, Jacques, 4,698,822, Cl. 372-70.000.

Blum, David M., to American Cyanamid Company. Process for producting 10-phenyl-10H-phenoxaphoshine. 4,698,447, Cl. 568-12.000.

Boats of the Future, Inc.: *See*—
May, Billy D., 4,697,373, Cl. 43-9.000.

Bobst SA: *See*—
Fuchs, Werner; and Rebeaud, Jean-Claude, 4,697,338, Cl. 29-799.000.

Boccadoro, Yves; and Shuttler, Philippe, to Regie Nationale des Usines Renault. Process and device for regulating the rotation speed in neutral of a controlled ignition engine equipped with intermittently functioning accessories. 4,697,562, Cl. 123-339.000.

Bock, Erich: *See*—
Handschuch, Karl; and Bock, Erich, 4,697,409, Cl. 57-401.000.

Bocker, Jurgen; Luther, Hans W.; Wallow, Peter; and Fritsch, Horst, to Rheinmetall GmbH. Subcaliber, armor piercing penetrator projectile. 4,697,525, Cl. 102-518.000.

Boeing Company, The: *See*—
Dodds, John J., 4,698,115, Cl. 156-382.000.
Hardy, Richard; Neumann, Frank D.; and Ruzicka, Dennis E., 4,697,764, Cl. 244-137.400.
Jeppsson, Jan, 4,698,773, Cl. 364-474.000.
Vermilye, Michael L., 4,697,763, Cl. 244-129.400.

BOGE GmbH: *See*—
Brenner, Heinz; Meyer, Heinrich; and Schmidt, Kurt, 4,697,794, Cl. 267-195.000.
Reuter, Horst; Quast, Jorn-Rainer; Maier, Peter; and Brenner, Heinrich, 4,697,793, Cl. 267-195.000.

Bohm, Horst: *See*—
Stahl, Bernard; and Bohm, Horst, 4,697,800, Cl. 269-32.000.

Boisvert, Jean-Paul: *See*—
Green, Marshall S., deceased; and Boisvert, Jean-Paul, 4,698,134, Cl. 162-199.000.

Bollman, Robert L.: *See*—
Bassett, Gregory S.; and Bollman, Robert L., 4,698,116, Cl. 156-423.000.

Bolton, John D'Arcy. Stump trimmer. 4,697,625, Cl. 144-2.00N.

Bonazza, Walter J.: *See*—
Caro, Edward R.; and Bonazza, Walter J., 4,698,028, Cl. 439-271.000.

Boothe, Lee H., to Wing, Harold R. Release mechanism for locking hinge for multi-positioned ladder. 4,697,305, Cl. 16-329.000.

Bordat, Andre : *See*—
Bordreuil, Jacques; Lepage, Michel; and Bordat, Andre , 4,697,533, Cl. 114-44.000.

Bordbar, Hosrow T., to Thomas & Betts Corporation. Strippable shielded electrical cable assembly. 4,698,457, Cl. 174-36.000.

Bordreuil, Jacques; Lepage, Michel; and Bordat, Andre , to Constructions Mecaniques de Normandie. Device for hoisting boats on board ships. 4,697,533, Cl. 114-44.000.

Borgmann, Robert E.: *See*—
Monteith, Robert C.; and Borgmann, Robert E., 4,698,482, Cl. 219-121.0LV.

Borroni, Andrea: *See*—
Marin, Carlo; Lanfranconi, Gianmario; and Borroni, Andrea, 4,698,009, Cl. 425-196.000.

Borsig GmbH: *See*—
Kehrer, Wolfgang, 4,697,550, Cl. 122-34.000.

Bothe, Lothar; and Crass, Guenther, to Hoechst Aktiengesellschaft. Polyolefin film having improved mechanical properties. 4,698,261, Cl. 428-204.000.

Bothwell, Peter W. Internal combustion engine and cylinder head therefor. 4,697,554, Cl. 123-90.220.

Bottch, Henning: *See*—
Hausberg, Hans-Heinrich; Bottch, Henning; Gottschlich, Rudolf; Seyfried, Christoph; and Minck, Klaus-Otto, 4,698,351, Cl. 514-338.000.

Bouchard, Andre C.; and Thibault, Paul A., to GTE Products Corporation. Method of making arc discharge lamps. 4,698,040, Cl. 445-26.000.

Boudewijns, Arnoldus J. J., to U.S. Philips Corp. Method of manufacturing an antiblooming image sensor device. 4,697,329, Cl. 437-2.000.

Bouldin, Dwight: *See*—
Bouldin, Floyd E.; Bouldin, Lloyd; Bouldin, Dwight; and Pack, Jerry W., 4,697,623, Cl. 141-80.000.

Bouldin, Floyd E.; Bouldin, Lloyd; Bouldin, Dwight; and Pack, Jerry W., to Bouldin & Lawson, Inc. Apparatus for continuously filling and preparing pots for receiving plants. 4,697,623, Cl. 141-80.000.

Bouldin & Lawson, Inc.: *See*—
Bouldin, Floyd E.; Bouldin, Lloyd; Bouldin, Dwight; and Pack, Jerry W., 4,697,623, Cl. 141-80.000.

Bouldin, Lloyd: *See*—
Bouldin, Floyd E.; Bouldin, Lloyd; Bouldin, Dwight; and Pack, Jerry W., 4,697,623, Cl. 141-80.000.

Boulitrop, Francois; Chartier, Eric; Mourey, Bruno; and Le Berre, Serge, to Thomson-CSF. Method of fabrication of a control transistor for a flat-panel display screen. 4,697,331, Cl. 437-82.000.

Boundy, Francis J. Novelty golf ball. 4,697,807, Cl. 272-27.00N.

Bourke, Edward L.; and Cartwright, James E., to Helix Technology Corporation. Pressure relief filter and valve and cryopump utilizing the same. 4,697,617, Cl. 137-549.000.

Bouvard, Andre ; and Hulin, Jean Pierre, to Lignes Telegraphiques et Telephoniques. Device for protecting optical fibers freed at the end of a cable element. 4,697,873, Cl. 350-96.230.

Bouwer, Adrianus G., to U.S. Philips Corporation. Positioning device. 4,698,575, Cl. 318-640.000.

Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., to Emco Wheaton, Inc. Vapor recovery nozzle. 4,697,624, Cl. 141-208.000.

Brackett, John E.; and Dahlberg, Larry J., to Fishing Designs, Inc. Palming grip fishing rod. 4,697,376, Cl. 43-23.000.

Bradshaw, Franklin C.; and Maloney, Patrick M., to Kroy Inc. Lettering apparatus. 4,697,940, Cl. 400-134.600.

Brand, Hans-Norbert, to Gesellschaft fur Strahlen-und Umweltforschung m.b.H. Finger ring dosimeter. 4,698,505, Cl. 250-337.000.

Brandle, Charles D., Jr.; Fratello, Vincent J.; and Wolfe, Raymond, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Magnetic device and method of manufacture. 4,698,820, Cl. 372-41.000.

Brandt, Bernd A. Spring-loaded suspension system for augers and screw anchors. 4,697,648, Cl. 173-162.00R.

Brandt, Lennart H., to AB Volvo Penta. Propeller drive for boats. 4,698,036, Cl. 440-62.000.

Branigan, John T.; and Malaise, Jacques J., to General Dynamics, Pomona Division. Dual mode target seeking system. 4,698,638, Cl. 343-725.000.

Brassert, Walter L.; and Heitmann, Arnold M., to Northern Research & Engineering Corp. Fog oil smoke generator. 4,697,520, Cl. 102-334.000.

Braun, Jeffrey J.; and Cook, Kenneth M., to Motorola, Inc. Power driver having short circuit protection. 4,698,582, Cl. 323-285.000.

Brendl, Rudolf; Hahn, Alfred; and Weiss, Karl, to Siemens Aktiengesellschaft. X-ray diagnostics installation including a tilting table. 4,697,802, Cl. 269-323.000.

Brenner, Heinrich: *See—*
Reuter, Horst; Quast, Jorn-Rainer; Maier, Peter; and Brenner, Heinrich, 4,697,793, Cl. 267-195.000.

Brenner, Heinz; Meyer, Heinrich; and Schmidt, Kurt, to BOGE GmbH. Rubber mounting with hydraulic damping. 4,697,794, Cl. 267-195.000.

Brenner, Max, to Ciba-Geigy AG; and Brenner, Max, a part interest. Separating process. 4,698,159, Cl. 210-634.000.

Brewer, Richard A.; Merk, Robert H.; and Orndorff, Gary J., to Procter & Gamble Company, The. Apparatus for increasing the visibility of discrete morsels contained within a baked food product. 4,697,505, Cl. 99-450.100.

Breyer, Branko; and Cikes, Ivo, to Telectronics N.V. Ultrasonically marked cardiac catheters. 4,697,595, Cl. 128-660.000.

Bricker, James C.; and Lippman, David H., to Hydro Systems Company. Faucet proportioner. 4,697,610, Cl. 137-3.000.

Bridgestone Cycle Co., Ltd.: *See—*
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, 4,697,469, Cl. 74-117.000.

Briggs, Garry L., to Hughes Tool Company. Corrosion inhibitor for well acidizing treatments. 4,698,168, Cl. 252-8.553.

Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., to Baxter Travenol Laboratories, Inc. Integrated membrane oxygenator, heat exchanger and reservoir. 4,698,207, Cl. 422-46.000.

Brinkhoff, Helmut; Gloning, Gunter; and Steinkotter, Heinz-Gunter, to Miele & Cie. GmbH & Co. Vacuum cleaner having a vacuum hose holder. 4,697,299, Cl. 15-323.000.

British Aerospace PLC: *See—*
Entwistle, Brian; Roberts, Peter; and Rogerson, John M., 4,698,766, Cl. 364-468.000.

British-American Tobacco Company Limited: *See—*
Brown, Ian C.; Hedge, Roger W.; and Molyneux, David J., 4,697,604, Cl. 131-296.000.

Brock, Marilyn A.: *See—*
Scheffer, Daniel G.; and Brock, Marilyn A., 4,697,658, Cl. 177-229.000.

Brockmeier, Arthur E.: *See—*
Brockmeier, Kenneth R.; and Brockmeier, Arthur E., 4,697,404, Cl. 56-6.000.

Brockmeier, Kenneth R.; and Brockmeier, Arthur E., to Brockmeier Sod Farms. Tractor mower system. 4,697,404, Cl. 56-6.000.

Brockmeier Sod Farms: *See—*
Brockmeier, Kenneth R.; and Brockmeier, Arthur E., 4,697,404, Cl. 56-6.000.

Brodmann, Richard: *See—*
Bernitz, Bernhard; Brodmann, Richard; and Hermann, Dietmar, 4,698,193, Cl. 264-171.000.

Brooks, Janet L.: *See—*
Youngquist, Robert C.; Brooks, Janet L.; Fesler, Kenneth A.; Cutler, Cassius C.; and Shaw, Herbert J., 4,697,926, Cl. 356-345.000.

Brophy, William S., to Marlin Firearms Company. Buttplate with sliding cover for buttstock storage chamber. 4,697,367, Cl. 42-71.010.

Brother Kogyo Kabushiki Kaisha: *See—*
Sato, Yoshitsugu; and Furukawa, Satoshi, 4,698,626, Cl. 340-710.000.

Brown, Boveri & CIE AG: *See—*
Goehle, Rolf; Schmitt, Volker; Bruckner, Werner; and Greefe, Klaus, 4,698,609, Cl. 335-255.000.

Brown, Edward M.: *See—*
Chamberlin, Edward B.; Brown, Edward M.; and Towns, Edward J., 4,697,993, Cl. 417-514.000.
Towns, Edward J.; and Brown, Edward M., 4,697,714, Cl. 215-252.000.

Brown, George M.: *See—*
Stewart, John; and Brown, George M., 4,697,671, Cl. 188-72.900.

Brown, Ian C.; Hedge, Roger W.; and Molyneux, David J., to British-American Tobacco Company Limited. Expansion of tobacco. 4,697,604, Cl. 131-296.000.

Brown, John G. Modular-accessible-tiles providing accessibility to conductors and piping with improved sound isolation. 4,698,249, Cl. 428-44.000.

Brown, John W., to Qantix Corporation. Anti-glare filter. 4,697,881, Cl. 350-276.00R.

Brown, Richard E.: *See—*
Musser, John H.; and Brown, Richard E., 4,698,346, Cl. 514-293.000.

Brown, Robert R. Vehicle having a dual drive wheel assembly and traction device. 4,697,628, Cl. 152-213.00R.

Brown, Wayne M.; Neal, William F.; and Schwarz, Frederick M., to United Technologies Corporation. Rotor thrust balancing. 4,697,981, Cl. 415-104.000.

Brubaker, Weldon L.: *See—*
Finney, James E.; and Brubaker, Weldon L., 4,697,340, Cl. 29-862.000.

Bruckner, Werner: *See—*
Goehle, Rolf; Schmitt, Volker; Bruckner, Werner; and Greefe, Klaus, 4,698,609, Cl. 335-255.000.

Bruker Medizintechnik GmbH: *See—*
Zeiger, Heinz; and Laukien, Gunther R., 4,698,594, Cl. 324-309.000.

Brunel, Gerald. Installation for monitoring the functioning of a boiler. 4,698,015, Cl. 431-76.000.

Brunn, Horst: *See—*
Burow, Wilfried; Printzen, Helmut; Brunn, Horst; and Nollen, Klaus, 4,698,100, Cl. 106-304.000.

Brunner, Hans-Georg; Burdeska, Kurt; and Fory, Werner, to Ciba-Geigy Corporation. 2-phenylpyrimidines, 2-naphthylpyrimidines and 2-heterocyclylpyrimidines as safeners for protecting cultivated plant against phytotoxic damage caused by herbicides. 4,698,091, Cl. 71-87.000.

Bryan, Charles F., Jr., to United States of America, National Aeronautics and Space Administration. Lightning discharge protection rod. 4,698,723, Cl. 361-218.000.

Buchanan, Sabern D.; and Faulkner, Stephen L., to Unit Rig & Equipment Company. Use of SCR's in extended retarding. 4,698,561, Cl. 318-87.000.

Buchholz, Rainer: *See—*
Zodrow, Rudolf; and Buchholz, Rainer, 4,697,691, Cl. 198-425.000.

Budd Company, The: *See—*
Stevens, Raymond R., Jr.; Beisel, Robert R.; and Griffiths, Stephen F., 4,697,448, Cl. 72-405.000.

Budel, Josef: *See—*
Dantlgraber, Jorg; Budel, Josef; and Rub, Josef, 4,697,990, Cl. 417-204.000.

Buffalo Dental Manufacturing Co., Inc.: *See—*
Nevin, Donald M., 4,698,206, Cl. 422-24.000.

Bugg, Richard E. F.: *See—*
Kinghorn, John R.; and Bugg, Richard E. F., 4,698,677, Cl. 358-147.000.

Bulgher, David E.: *See—*
Jones, Franklin B.; Milberger, Walter E.; Bulgher, David E.; and Kerfoot, Charles S., 4,698,742, Cl. 363-124.000.

Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary; and Sarin, Vinod K., to GTE Laboratories Incorporated. Coated cemented carbide tool for steel roughing applications and methods for machining. 4,698,266, Cl. 428-457.000.

Bumpers, Norman R., to MicroSpun Technologies Inc. Rotating filter apparatus for separating fine particles of solids from a liquid. 4,698,156, Cl. 210-331.000.

Bungeroth, Herbert; and Wessel, Otto, to Mannesmann Aktiengesellschaft. Process for the production of an ingot. 4,697,631, Cl. 164-46.000.

Burckett St. Laurent, James C. T.; and Busch, Alfred, to Procter & Gamble Company, The. Detergent with fabric softener. 4,698,167, Cl. 252-8.800.

Burdeska, Kurt: *See—*
Brunner, Hans-Georg; Burdeska, Kurt; and Fory, Werner, 4,698,091, Cl. 71-87.000.

Burgin, Kermit H. Acrylooptic tongue depressor and handle therefor incorporating adjustable viewing optics. 4,697,578, Cl. 128-16.000.

Burley, Gregory S., to Northern Telecom Limited. Peak optical power control circuit for laser driver. 4,698,817, Cl. 372-31.000.

Burlington Industries, Inc.: *See—*
Gamblin, Rodger L., 4,698,642, Cl. 346-75.000.

Burns, Daniel J.; Eldering, Charles A.; and Pronobis, Mark T., to United States of America, Air Force. Method of characterizing critical timing paths and analyzing timing related failure modes in very large scale integrated circuits. 4,698,587, Cl. 324-73.00R.

Burow, Wilfried; Printzen, Helmut; Brunn, Horst; and Nollen, Klaus, to Bayer Aktiengesellschaft. Iron oxide yellow pigments having a low silking effect and a process for production thereof. 4,698,100, Cl. 106-304.000.

Burt, Gary W.: *See—*
Grant, William F.; Burt, Gary W.; and Kumnick, Albert J., 4,697,324, Cl. 29-419.00R.

Burt, Peter J.; and Adelson, Edward H., to RCA Corporation. Method for compensating for void-defects in images. 4,698,843, Cl. 382-54.000.

Burvee, Richard W., to Minnesota Mining and Manufacturing Company. Disposable, electrically conductive body grounding strap. 4,698,724, Cl. 361-220.000.

Burwen, Eric D.: *See—*
Wells, William D.; Robinson, David M.; DeLuca, Richard M.; and Burwen, Eric D., 4,698,509, Cl. 250-492.200.

Busch, Alfred: *See—*
Burckett St. Laurent, James C. T.; and Busch, Alfred, 4,698,167, Cl. 252-8.800.

Buss AG: *See—*
Wehrli, Werner; and Franz, Peter, 4,698,378, Cl. 523-318.000.
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, to Metal Box P.L.C. Dimensionally stable thermoplastic tubular articles. 4,697,718, Cl. 220-82.00R.
Butcher, Robert M. Mechanism for valve gated injection molding with resilient retaining ring. 4,698,013, Cl. 425-549.000.
Butterfield, Eric J.: *See—*
Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., 4,697,624, Cl. 141-208.000.
Buzby, George C., Jr.; and Colatsky, Thomas J., to American Home Products Corporation. 4-amino benzenesulfonamides. 4,698,445, Cl. 564-86.000.
Byrne, John V.; and O'Dwyer, Jeremiah B., to Kollmorgen Technologies Corporation. Electrical drive systems incorporating variable reluctance motors. 4,698,537, Cl. 310-168.000.
Bytzek, Klaus K.; and Antchak, John R., to Litens Automotive Inc. Belt tensioner with frustoconical pivot bearing. 4,698,049, Cl. 474-135.000.
C. & J. Clark Limited: *See—*
Ralphs, George T., 4,698,006, Cl. 425-185.000.
Caber Italia S.p.A.: *See—*
Sartor, Leo, 4,697,360, Cl. 36-2.600.
California Institute of Technology: *See—*
Daube, Bruce C., Jr.; Flagan, Richard C.; and Hoffmann, Michael R., 4,697,462, Cl. 73-863.210.
Peek, Ralf, 4,697,395, Cl. 52-167.000.
Cameron, Robert E. Adjustable cable driven carriage system and method. 4,697,487, Cl. 83-708.000.
Campbell, Daniel P.: *See—*
Larsen, James W.; and Campbell, Daniel P., 4,698,522, Cl. 307-309.000.
Canadian Industrial Innovation Centre/Waterloo: *See—*
Milgram, Paul, 4,698,668, Cl. 358-92.000.
Canadian Patents and Development Limited: *See—*
Elias, Lorne, 4,698,071, Cl. 55-28.000.
Candor, James T. Electrostatic method and apparatus for treating material. 4,697,353, Cl. 34-1.000.
Canon Kabushiki Kaisha: *See—*
Ara, Yoji, 4,697,939, Cl. 400-124.000.
Eguchi, Masaharu; and Kiuchi, Masayoshi, 4,697,900, Cl. 354-215.000.
Fujibayashi, Kazuo; Tsunekawa, Tokuichi; and Ohmura, Hiroshi, 4,697,905, Cl. 354-406.000.
Hayashi, Kimiyoshi; Ohno, Akio; Hirooka, Kazuhiko; and Murayama, Yasushi, 4,697,915, Cl. 355-14.00D.
Inamoto, Tadayoshi, 4,698,645, Cl. 346-140.00R.
Kasuya, Yukio, 4,697,910, Cl. 355-3.00R.
Kawai, Tohru, 4,697,891, Cl. 350-429.000.
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,697,899, Cl. 354-173.110.
Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, 4,697,916, Cl. 355-14.00E.
Matsuzaka, Kenzo; Okano, Seitaro; and Nakamura, Nobuo, 4,698,089, Cl. 65-290.000.
Nishimuro, Yoshiaki; Hirata, Osamu; Kano, Kuniomi; Miyakawa, Akira; Fushimoto, Hideo; and Sekine, Kazumi, 4,698,783, Cl. 364-710.000.
Ochi, Hiroshi; Tetsutani, Nobuji; Yamamoto, Tetsuji; Kitani, Shigehisa; and Watanabe, Asao, 4,698,688, Cl. 358-257.000.
Ohtaka, Keiji; Hiramatsu, Akira; Suda, Yasuo; Akashi, Akira; and Ishizaki, Akira, 4,698,492, Cl. 250-201.000.
Okada, Shinjiro; and Tamura, Yasuyuki, 4,697,887, Cl. 350-350.00S.
Okamura, Shigeru, 4,698,566, Cl. 318-332.000.
Ozawa, Kunitaka; Haruta, Masahiro; Eida, Tsuyoshi; and Hamamoto, Takashi, 4,698,151, Cl. 210-96.100.
Sato, Yasuhisa; Yamada, Yasuyuki; Nakayama, Hiroki; and Oizumi, Kouji, 4,697,882, Cl. 350-287.000.
Sekiguchi, Kyoji; and Kohayamawa, Yoshimi, 4,697,895, Cl. 351-243.000.
Sueda, Tetsuo; and Ando, Toshinori, 4,698,511, Cl. 250-560.000.
Takahashi, Kazuhisa; Kawasaki, Keiichi; and Itoh, Yuji, 4,698,648, Cl. 346-108.000.
Takahashi, Kouji; and Fujiwara, Akihiro, 4,697,904, Cl. 354-403.000.
Tamamura, Hideo, 4,697,897, Cl. 354-64.000.
Tanioka, Hiroshi, 4,698,690, Cl. 358-283.000.
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Cantar Corporation: *See—*
Lazar, Stanley, 4,698,109, Cl. 156-145.000.
Capello, Giuseppe: *See—*
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Caraway, Bobby L.: *See—*
Caraway, Miles F.; and Caraway, Bobby L., 4,697,639, Cl. 166-82.000.
Caraway, Miles F.; and Caraway, Bobby L., to Fire-Fox International, Inc. Blow-out protector and fire control system for petroleum exploration. 4,697,639, Cl. 166-82.000.
Cardenas, Frank; and Stay, Ellsworth J. Method for obtaining tissue and cells by fine needle aspiration for cytology/biopsy and kit relative to the same. 4,697,600, Cl. 128-753.000.
Cardwell, Walter T., Jr. Semiconductor devices controlled by depletion regions. 4,698,653, Cl. 357-22.000.
Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co.: *See—*
Eichinger, Johann, 4,697,527, Cl. 105-133.000.
Carl, William P.; and Birdwell, Jeffrey D., to Dow Chemical Company, The. Method for sizing and hydrolyzing polytetrafluoroethylene fabrics, fibers, yarns, or threads. 4,698,243, Cl. 427-341.000.
Carlsson, Torsten L. T.: *See—*
Wikholm, Bert S.; Carlsson, Torsten L. T.; and Oster, Ake R., 4,698,310, Cl. 435-316.000.
Carman, Robert J.: *See—*
Maitland, Arthur; Menown, Hugh; Strudwick, Ian A.; Weatherup, Clifford R.; and Carman, Robert J., 4,698,546, Cl. 313-446.000.
Carmillet, Roger F.: *See—*
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Carnez, Bernard: *See—*
Bessonneau, Guy; Carnez, Bernard; Derewonko, Henry; and Lepage, Joel, 4,698,661, Cl. 357-74.000.
Caro, Edward R.; and Bonazza, Walter J., to United States of America, National Aeronautics and Space Administration. Coaxial cable connector. 4,698,028, Cl. 439-271.000.
Carpenter, James H., Jr.; and Peters, Kenneth R. Vane retention apparatus for abrasive blasting machine. 4,697,391, Cl. 51-434.000.
Carrell, Ross M., to RCA Corporation. Article manipulation system. 4,697,689, Cl. 198-394.000.
Carrigan, Erwin R.: *See—*
Johnson, Harold R., III; Phillips, Allyn E.; Carrigan, Erwin R.; Virgo, Richard A.; and Mickelson, James E., 4,697,675, Cl. 192-7.000.
Carroll, Noel. Oil recovery systems. 4,698,152, Cl. 210-96.100.
Carter, Jeff C.; and Husted, Raymond R., to Xerox Corporation. Reproduction machine with a chain of sorter modules and a method to perform chaining tasks. 4,698,772, Cl. 364-900.000.
Cartrex: *See—*
Henderson, James J.; and Newell, Chester W., 4,697,759, Cl. 242-179.000.
Cartwright, James E.: *See—*
Bourke, Edward L.; and Cartwright, James E., 4,697,617, Cl. 137-549.000.
Cascone, Michael. Removable drawbar for trailers. 4,697,819, Cl. 280-491.00E.
Casey, Robert F., to RCA Corporation. Progressive scan display system having intra-field and inter-field processing modes. 4,698,675, Cl. 358-140.000.
Casio Computer Co., Ltd.: *See—*
Okuyama, Masayoshi; Kido, Yukio; Mimura, Isao; and Nakajima, Etsuro, 4,697,931, Cl. 368-223.000.
Casket Shells, Inc.: *See—*
Semon, Joseph R., 4,697,316, Cl. 27-1.000.
Casnovsky, William M.: *See—*
Ng, Edward C.; and Casnovsky, William M., 4,698,782, Cl. 364-708.000.
Cavaliere, Joseph R.; Chang, Albert Y.; and Robortaccio, Rocco J., to International Business Machines Corporation. Bi-directional transceiver circuit. 4,698,800, Cl. 370-24.000.
Cavalleri, Bruno: *See—*
Malabarba, Adriano; and Cavalleri, Bruno, 4,698,418, Cl. 530-317.000.
Cavicchi, Bruce T.; Dill, Hans G.; and Zemmrich, Dieter K., to Spectrolab, Inc. Solar cell with improved electrical contacts. 4,698,455, Cl. 136-256.000.
Cawley, Patrick W.: *See—*
Mason, Bradley R.; Mason, Jeffrey T.; and Cawley, Patrick W., 4,697,583, Cl. 128-80.00C.
Celotex Corporation, The: *See—*
Goll, John D., 4,698,257, Cl. 428-227.000.
Overgard, Bruce L., 4,697,304, Cl. 16-198.000.
Centre National de la Recherche Scientifique (C.N.R.S.): *See—*
Leprince, Philippe; Marec, Jean; Saada, Serge; Bloyet, Emile; and Migne, Jacques, 4,698,822, Cl. 372-70.000.
Centre National d'Etudes Spatiales: *See—*
Schneller, Alfred K., 4,697,416, Cl. 60-240.000.
Ceraver, S.A.: *See—*
Gillot, Jacques, 4,698,157, Cl. 210-496.000.
Cernansky, Joseph S.: *See—*
Rudell, Elliot A.; Cernansky, Joseph S.; and Foster, George T., 4,697,812, Cl. 273-86.00B.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., to Advanced Magnetics, Inc. Enzymatic reactions using magnetic particles. 4,698,302, Cl. 435-94.000.
Chamberlin, Edward B.; Brown, Edward M.; and Towns, Edward J., to Spray-All, Inc. Fluid medium compressor and user apparatus. 4,697,993, Cl. 417-514.000.
Chandler, Michael S.; and Fiddler, R. Charles, to Kolpak Industries, Inc. Rapid chill refrigerator control. 4,697,429, Cl. 62-203.000.
Chang, Albert Y.: *See—*
Cavaliere, Joseph R.; Chang, Albert Y.; and Robortaccio, Rocco J., 4,698,800, Cl. 370-24.000.
Chang, Shu-Kong: *See—*
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Chang, Thomas: *See—*
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Chapman, Dale B., to International Business Machines Corporation. Clock phase discriminator. 4,698,600, Cl. 331-1.00A.

Charles, Kirk W.: *See—*
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.

Charles Ross & Son Company: *See—*
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Charmilles Technologies S.A.: *See—*
Girardin, Roger, 4,698,478, Cl. 219-69.00W.

Chartier, Eric: *See—*
Boulitrop, Francois; Chartier, Eric; Mourey, Bruno; and Le Berre, Serge, 4,697,331, Cl. 437-82.000.

Chasseguet, Gustave: *See—*
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Chatham, Gregory A.: *See—*
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Chazalet, Maurice: *See—*
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Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., to Vsesojuzny Kardiologichesky Nauchny Tsentr Akademii Meditsinskikh Nauk SSSR. Hexapeptide. 4,698,419, Cl. 530-329.000.

Chedid, Louis: *See—*
Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, 4,698,330, Cl. 514-19.000.

Chemical Waste Management, Inc.: *See—*
Fochtman, Edward G.; and Swanstrom, Carl P., 4,697,457, Cl. 73-820.000.

Chemplex Industries, Inc.: *See—*
Solazzi, Michael C., 4,698,210, Cl. 422-102.000.

Chen, Chih-Ming: *See—*
Mackie, Gregory C.; Satra, Stephen E.; and Chen, Chih-Ming, 4,698,842, Cl. 381-1.000.

Chen, Chiu-Chao: *See—*
Young, Peter L.; and Chen, Chiu-Chao, 4,698,662, Cl. 357-80.000.

Chen, Horng-Yih: *See—*
Crandall, Terry G.; and Chen, Horng-Yih, 4,698,220, Cl. 423-607.000.

Chen, Wen-hsiung; and Klenke, Daniel J., to Compression Labs, Inc. Coding system for reducing redundancy. 4,698,672, Cl. 358-136.000.

Chenot, Charles F.; and Taylor, Robert E., to GTE Products Corporation. Lamp incorporating phosphor blend of calcium fluorophosphate and strontium halophosphate. 4,698,548, Cl. 313-487.000.

Chesworth, Graham; and Aspden, Garth J., to National Nuclear Corporation Limited. Retractable duct connectors in a nuclear reactor. 4,698,199, Cl. 376-206.000.

Chevron Research Company: *See—*
Santilli, Donald S.; Long, John J.; and Lewis, Robert T., 4,698,322, Cl. 502-74.000.
Schmadel, Donald C., Jr.; and Culver, William H., 4,697,888, Cl. 350-358.000.

Chianelli, Russell R.: *See—*
Ho, Teh C.; Chianelli, Russell R.; Jacobson, Allan J.; and Young, Archie R., 4,698,145, Cl. 208-18.000.

Chiang, Chang L. Process apparatus for making differently-shaped polyethylene bags and the method thereof. 4,698,112, Cl. 156-250.000.

Chiba, Sigeru. Ultrasonic disintegrating apparatus. 4,697,751, Cl. 241-301.000.

Chiba, Toshiyuki: *See—*
Takaya, Takao; Takasugi, Hisashi; Tsuji, Kiyoshi; and Chiba, Toshiyuki, 4,698,337, Cl. 514-206.000.

Chikura, Takashi: *See—*
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Chirico, George: *See—*
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Cho, Soo S., to Macho Products, Inc. Protective thigh and knee gear. 4,697,286, Cl. 2-22.000.

Choay, Jean: *See—*
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Chou, Richard T., to Du Pont de Nemours, E. I., and Company. Blend of chlorinated polyolefin elastomer and ethylene-containing terpolymer. 4,698,392, Cl. 525-189.000.

Chou, Yung-Sen, to Armco Inc. Wellhead body lockdown and method for engaging same. 4,697,828, Cl. 285-18.000.

Chow, Kung C.; and Sun, Shan C., to Westinghouse Electric Corp. Electronic reverse power relay. 4,698,718, Cl. 361-77.000.

Chrisman, Charles L.; Bidwell, Christopher A.; and Libey, George S, to Purdue Research Foundation. Method for production of tetraploid channel catfish. 4,697,546, Cl. 119-3.000.

Chugai Seiyaku Kabushiki Kaisha: *See—*
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Chun, Myung K., to General Electric Co. Optical transmission filter. 4,698,816, Cl. 372-19.000.

Chung, Alfred: *See—*
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Ryan, James W.; and Chung, Alfred, 4,698,356, Cl. 514-362.000.

Ciannella, Michael A., to Medi-Tech, Inc. Enteric feeding device. 4,698,056, Cl. 604-164.000.

Ciba-Geigy AG: *See—*
Brenner, Max, 4,698,159, Cl. 210-634.000.

Ciba-Geigy Corporation: *See—*
Brunner, Hans-Georg; Burdeska, Kurt; and Fory, Werner, 4,698,091, Cl. 71-87.000.
Drabek, Jozef, 4,698,358, Cl. 514-373.000.
Muller, Horst, 4,698,368, Cl. 521-93.000.
Pfeifer, Josef; and Duthaler, Rudolf, 4,698,295, Cl. 430-325.000.

Cikes, Ivo: *See—*
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Cilag, AG: *See—*
Niederer, Roland R.; and Zulliger, Hans W., 4,698,359, Cl. 514-396.000.

Cincinnati Milacron Inc.: *See—*
Monteith, Robert C.; and Borgmann, Robert E., 4,698,482, Cl. 219-121.0LV.

Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, to SGS Microelettronica SpA. Monolithically integratable high-efficiency control circuit for switching transistors. 4,698,519, Cl. 307-254.000.

Citizen Watch Co., Ltd.: *See—*
Suganuma, Kunio, 4,698,710, Cl. 360-106.000.

Citron, Stephen J., to Purdue Research Foundation. On-line engine torque and torque fluctuation measurement for engine control utilizing crankshaft speed fluctuations. 4,697,561, Cl. 123-339.000.

Clarius, George A., to Grumman Aerospace Corporation. RF amplitude modulator/mixer. 4,698,603, Cl. 332-31.00R.

Clarke, Allen P.: *See—*
Marwood, Warren; and Clarke, Allen P., 4,698,807, Cl. 371-11.000.

Clasen, Richard H.: *See—*
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Claxton, George P.: *See—*
Schnettler, Richard A.; Jones, Winton D., Jr.; and Claxton, George P., 4,698,353, Cl. 514-340.000.

Clement, Albrecht: *See—*
Becker, Rudiger; Clement, Albrecht; Virgilio, Gustav; and Weller, Hugo, 4,697,563, Cl. 123-421.000.

Cliffton, Michael D.: *See—*
Hill, H. Wayne, Jr.; and Cliffton, Michael D., 4,698,411, Cl. 528-303.000.

Cloverline Incorporated, The: *See—*
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Coalair Systems Limited Partnership: *See—*
Dunbar, Richard M.; Wynosky, Charles E.; and Stoiber, Henry E., 4,697,962, Cl. 406-15.000.

Coate, Godfrey T.: *See—*
Hilton, Richard D.; and Coate, Godfrey T., 4,698,635, Cl. 342-64.000.

Cockerell, William C., Jr., to Spymark, Incorporated. Systems for determining distances to and locations of features on a golf course. 4,698,781, Cl. 364-561.000.

Codding, Elias H., to Delta Technology Corporation. Sorter for agricultural products. 4,697,709, Cl. 209-549.000.

Cohen, Abraham B.: *See—*
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Colamco, Inc.: *See—*
Koch, G. Teryl; Smith, Thomas L.; Jacklin, Keith A.; and Hammond, James A., 4,698,252, Cl. 428-159.000.

Colatsky, Thomas J.: *See—*
Buzby, George C., Jr.; and Colatsky, Thomas J., 4,698,445, Cl. 564-86.000.

Cole, Gregory B. Device for slicing and storing food such as cheese and the like. 4,697,488, Cl. 83-437.000.

Cole, Ronald E., to Emhart Industries, Inc. Ice maker system. 4,697,432, Cl. 62-233.000.

Colegrove, Forrest D.: *See—*
Rice, Joseph A., Jr.; McGregor, Douglas D.; Colegrove, Forrest D.; and Marton, Bela, 4,697,519, Cl. 102-406.000.

Collier, Donald W.; and Fuller, Kip L., to Guardian Interlock Systems, Inc. Sobriety interlock with time-locked interlock mode. 4,697,666, Cl. 180-272.000.

Collins, Mark C., to Sony Corporation. Television signal processing apparatus. 4,698,678, Cl. 358-148.000.

Collins, Mark C., to Sony Corporation. Digital television signal processing apparatus. 4,698,698, Cl. 360-10.100.

Collins, Scott J., to Gardner, William E. Device for cutting shielded cable. 4,697,343, Cl. 30-90.300.

Colorocs Corporation: *See—*
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.

Colt Industries Inc.: *See—*
Patton, Roy D., 4,698,543, Cl. 313-357.000.

Comau S.p.A.: *See—*
Marinoni, Giorgio; and Capello, Giuseppe, 4,698,483, Cl. 219-121.0LU.

Cominco Ltd.: *See—*
Pelto, Elmer M.; and Pearson, Allan, 4,697,960, Cl. 405-260.000.

Commissariat a l'Energie Atomique: *See—*
Armand, Marie-Francoise; Daval, Jacques; Ferrand, Bernard; and Moriceau, Hubert, 4,698,281, Cl. 428-692.000.
Dedieu, Alain; Lockhart, Campbell; and Jolu, Etienne, 4,698,298, Cl. 435-7.000.
Lazzari, Jean-Pierre, 4,698,708, Cl. 360-103.000.
Lazzari, Jean-Pierre, 4,698,716, Cl. 360-135.000.
Masse, Jean, 4,698,201, Cl. 376-298.000.
Commonwealth of Australia, The: *See—*
Marwood, Warren; and Clarke, Allen P., 4,698,807, Cl. 371-11.000.
Commonwealth Scientific and Industrial Research Org.: *See—*
Evans, Neil A.; Milligan, Brian; and Waters, Peter J., 4,698,064, Cl. 8-128.00R.
Compression Labs, Inc.: *See—*
Chen, Wen-hsiung; and Klenke, Daniel J., 4,698,672, Cl. 358-136.000.
Concept Polymer Technologies, Inc.: *See—*
Johnson, Theodore D., 4,698,059, Cl. 604-270.000.
Conoco Inc.: *See—*
McConaghy, James R., Jr., 4,698,147, Cl. 208-107.000.
Conrad, Roddy M.: *See—*
Blair, Leslie M.; and Conrad, Roddy M., 4,698,440, Cl. 560-205.000.
Conrad, Ulrich; Grohn, Michael; and Moser, Peter, to Daimler-Benz Aktiengesellschaft. Connecting line between a compressor of an exhaust gas turbocharger flangedly connected at an exhaust gas manifold of an internal combustion engine and a suction pipe. 4,697,423, Cl. 60-605.000.
Consiglio Nazionale Delle Ricerche: *See—*
Bertini, Vincenzo; Marabini, Anna; De Munno, Angela; Barbaro, Maria; and Pocci, Marco, 4,698,171, Cl. 252-60.000.
Consolidated-Bathurst, Inc.: *See—*
Green, Marshall S., deceased; and Boisvert, Jean-Paul, 4,698,134, Cl. 162-199.000.
Constructions Mecaniques de Normandie: *See—*
Bordreuil, Jacques; Lepage, Michel; and Bordat, Andre , 4,697,533, Cl. 114-44.000.
Conti Paoli & Meritex S.r.l.: *See—*
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Continental Gummi-Werke Aktiengesellschaft: *See—*
Bernitz, Bernhard; Brodmann, Richard; and Hermann, Dietmar, 4,698,193, Cl. 264-171.000.
Schallmeier, Gunter; and de Vries, Gerhard, 4,698,245, Cl. 428-33.000.
Cook, John S., to Dorran Photonics Incorporated. Termination of optical fibers. 4,697,871, Cl. 350-96.210.
Cook, Kenneth M.: *See—*
Braun, Jeffrey J.; and Cook, Kenneth M., 4,698,582, Cl. 323-285.000.
Coons, Randall P.: *See—*
Loomer, Weston R.; and Coons, Randall P., 4,697,977, Cl. 414-662.000.
Cooper, Charles E.; and Vest, Glenn E., to General Electric Company. Automatic tunnel detector for a self-propelled traction vehicle. 4,698,761, Cl. 364-424.000.
Cooper, Martin H.: *See—*
Sievers, Robert K.; Cooper, Martin H.; and Tupper, Robert B., 4,698,200, Cl. 376-233.000.
Cooper, Ralph M.: *See—*
Hayes, Earl J.; Cooper, Ralph M.; Denlinger, Keith R.; and Shuey, John R., 4,697,864, Cl. 439-444.000.
CooperVision, Inc.: *See—*
Graham, William M.; Vaughn, Wade C.; and Inman, Charles M., 4,697,697, Cl. 206-5.100.
Copeland, Wayne E. Illuminated stepping pad. 4,697,950, Cl. 404-9.000.
Corboy, John F., Jr.; Pagliaro, Robert H., Jr.; Jastrzebski, Lubomir L.; and Soydan, Ramazan, to RCA Corporation. Method of depositing uniformly thick selective epitaxial silicon. 4,698,316, Cl. 437-89.000.
Cordes, Walter J.: *See—*
Blaisdell, Charles T.; Cordes, Walter J.; Heinsohn, George E.; Kook, John F.; and Kosak, John R., 4,698,438, Cl. 558-3.000.
Cornut, Philippe: *See—*
Belot, Dominique; Rade, Jean-Yves; Piffard, Jean-Francois; Larquet, Christian; and Cornut, Philippe, 4,698,218, Cl. 423-347.000.
Corsello, Vincent: *See—*
Sheu, Shan-Shan; Yang, Robert K.; and Corsello, Vincent, 4,698,232, Cl. 426-572.000.
Cote, Laurence G., to Litton Systems Inc. System for reducing the sensitivity of a ring laser gyro to changes in a magnetic field. 4,698,823, Cl. 372-99.000.
Cotic, Dennis J.: *See—*
Pajerski, Michael J.; Gray, Steven J.; Flakas, Gerald K.; and Cotic, Dennis J., 4,697,661, Cl. 180-6.500.
Cox, David H.; and Andreas, David W., to Golden Valley Microwave Foods Inc. Microwave heating stand with electrically isolated reflector. 4,698,472, Cl. 219-10.55E.
Craig, William G.: *See—*
Gonzalez, Avelino J.; Murphy, Franklin J.; Emery, Franklin T.; Weyant, Perry A.; and Craig, William G., 4,698,756, Cl. 364-557.000.
Cramm, Jeffrey R.; and Bailey, Kristy M., to Nalco Chemical Company. Water-absorbent acrylic acid polymer gels. 4,698,404, Cl. 526-204.000.
Crandall, Terry G.; and Chen, Horng-Yih, to Du Pont de Nemours, E. I., and Company. Partitioned reduction process for ferromagnetic chromium dioxide. 4,698,220, Cl. 423-607.000.
Crane, Jacob; Muench, George J.; Saleh, Yousef; and Lin, Lifun, to Olin Corporation. Techniques for preparing magnetic particles having utility in recording media. 4,698,140, Cl. 204-146.000.
Cranston, Albert E., III; and Kudlicka, Mark L., to Cranston Machinery Co., Inc. Contamination deflector system for bale binding machines. 4,697,510, Cl. 100-14.000.
Cranston Machinery Co., Inc.: *See—*
Cranston, Albert E., III; and Kudlicka, Mark L., 4,697,510, Cl. 100-14.000.
Crass, Guenther: *See—*
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Crawford, Peter F.: *See—*
Maycock, Ian C.; and Crawford, Peter F., 4,697,684, Cl. 192-107.00R.
Creed, John, to Smabathavner a.s. Arrangement for interconnecting concrete pontoons. 4,697,539, Cl. 114-266.000.
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Pontagnier, Henri; and Prat, Gisele, to Societe Cortial, S.A. (Alkoxy-2)phenylpiperazines having alpha-1 and beta blocking properties. 4,698,343, Cl. 514-255.000.
Croft, Alan P., to Dow Chemical Company, The. 2-methyl-4-benzyl-5-oxazolidinone. 4,698,433, Cl. 548-228.000.
Cronin, John V., to M&T Chemicals Inc. Device for aligning a photomask onto a printed wiring board. 4,698,284, Cl. 430-5.000.
Crooks, Lawrence E., to University of California, The Regents of the. Apparatus and method for T1 NMR imaging using spin echo NMR responses elicited by initial excitation pulses of differing nutation values. 4,698,593, Cl. 324-309.000.
Crookston, Byron F., deceased; and by Crookston, JenaVee S., administrator. Light emitting device. 4,697,890, Cl. 350-407.000.
Crookston, JenaVee S., administrator: *See—*
Crookston, Byron F., deceased; and Crookston, JenaVee S., administrator, 4,697,890, Cl. 350-407.000.
Crosby, Martin G., to Serotonin Industries of Charleston. Method and compositions for controlling pain, depression and sedation. 4,698,342, Cl. 514-253.000.
Crosfield Electronics (USA) Limited: *See—*
Fry, Richard L.; and Beaumont, Richard J., 4,698,692, Cl. 358-299.000.
Sepai, Dinyar, 4,698,515, Cl. 250-578.000.
Crowell Corporation, The: *See—*
Raszewski, Lewis R., 4,698,254, Cl. 428-215.000.
Cruce, Evie C. Apparatus for segmenting edible peels of fruit and the like. 4,697,345, Cl. 30-315.000.
Csongor, Desider G., to Northern Lights Trust of February 14, 1978. Modular mixing apparatus including interchangeable fluid processing means. 4,697,928, Cl. 366-80.000.
CTS Corporation: *See—*
Kuo, Charles C. Y., 4,698,265, Cl. 428-432.000.
Culver, William H.: *See—*
Schmadel, Donald C., Jr.; and Culver, William H., 4,697,888, Cl. 350-358.000.
Cumming Corporation: *See—*
Cumming, Newell E.; and Sidell, James H., 4,698,074, Cl. 55-126.000.
Cumming, Newell E.; and Sidell, James H., to Cumming Corporation. Air cleaning apparatus. 4,698,074, Cl. 55-126.000.
Cunningham, Allen B., to Exxon Production Research Company. Acoustic well logging method for improved amplitude data acquisition. 4,698,791, Cl. 367-25.000.
Cupidro, Vincent N.: *See—*
Pedersen, David; and Cupidro, Vincent N., 4,697,335, Cl. 29-620.000.
Curry, Martin W., to Royal Master Systems, Inc. Storage container for floppy discs. 4,697,704, Cl. 206-444.000.
Custode, Frank Z., to Rockwell International Corporation. Method of making hardened NMOS sub-micron field effect transistors. 4,697,328, Cl. 437-41.000.
Cutler, Cassius C.: *See—*
Youngquist, Robert C.; Brooks, Janet L.; Fesler, Kenneth A.; Cutler, Cassius C.; and Shaw, Herbert J., 4,697,926, Cl. 356-345.000.
Cyclops Corporation: *See—*
Ryan, Thomas G., 4,697,399, Cl. 52-303.000.
D. L. Fried Associates, Inc.: *See—*
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Dada, Abdul G.: *See—*
Linz, David G.; Grier, Robert K., Jr.; Wetzel, Jennifer A.; and Dada, Abdul G., 4,698,214, Cl. 423-260.000.
Dahlberg, Larry J.: *See—*
Brackett, John E.; and Dahlberg, Larry J., 4,697,376, Cl. 43-23.000.
Daicel Chemical Industries, Ltd.: *See—*
Mitani, Tadayuki; Endo, Mamoru; and Hiramoto, Takashi, 4,698,441, Cl. 562-531.000.
Daido Tokushuko Kabushikikaisha: *See—*
Furukawa, Toshiharu; Shimura, Susumu; Takai, Fumio; Sano, Norio; and Ishida, Tomonobu, 4,697,532, Cl. 110-346.000.
Daidousanso Co., Ltd.: *See—*
Yoshino, Akira, 4,698,079, Cl. 62-11.000.
Daihatsu Diesel Mfg. Co., Ltd.: *See—*
Goto, Teruo; Takata, Yoshirou; Muraji, Kenji; and Higashi, Mikio, 4,698,622, Cl. 340-648.000.
Daiko, Yoichi; Masuda, Masami; and Terabayashi, Takao, to Hitachi, Ltd. Boring machine. 4,697,964, Cl. 408-6.000.
Daimler-Benz: *See—*
Tomforde, Johann, 4,697,843, Cl. 296-97.00G.

Daimler-Benz Aktiengesellschaft: *See—*
Conrad, Ulrich; Grohn, Michael; and Moser, Peter, 4,697,423, Cl. 60-605.000.
Dengler, Alfred; and Medler, Eberhard, 4,697,741, Cl. 239-391.000.
Hertweck, Gernot; Kappis, Fritz; Kellermann, Guenter; and Schalueck, Klaus, 4,697,569, Cl. 123-568.000.
Klein, Norbert; Parisch, Jochen; and Zweigart, Gerhard, 4,697,841, Cl. 296-84.00R.
Kleineberg, Wolfgang; and Scheurenbrand, Dieter, 4,697,612, Cl. 137-39.000.
Scholz, Helmut, 4,697,852, Cl. 303-7.000.
Scholz, Helmut, 4,697,853, Cl. 303-7.000.
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Dainichiseika Color & Chemicals MFG. Co., Ltd.: *See—*
Nakamura, Michiei; Takeuchi, Hitoshi; Takahashi, Tetujiro; Takizawa, Minoru; and Horiguchi, Shojiro, 4,698,099, Cl. 106-288.00R.

Dainippon Ink and Chemicals, Inc.: *See—*
Tanaka, Yasuyuki; Takatsu, Haruyoshi; and Takeuchi, Kiyohumi, 4,698,177, Cl. 252-299.630.

Daiwa Golf Co., Ltd.: *See—*
Yamada, Magoichi, 4,697,814, Cl. 273-169.000.

Daiwa Seiko, Inc.: *See—*
Hirose, Haruomi; and Atobe, Takashi, 4,697,758, Cl. 242-84.10M.

Danielson, Lincoln V.: *See—*
Beck, Willi K.; and Danielson, Lincoln V., 4,698,466, Cl. 200-61.780.

Danner, Michael E.; and Hieber, Thomas E., to Sperti Drug Products, Inc. Method and apparatus for producing a product which stimulates skin respiration and product produced thereby. 4,698,166, Cl. 210-774.000.

D'Annunzio, Philip. Adjustable ring structure. 4,697,437, Cl. 63-15.500.

Dantlgraber, Jorg; Budel, Josef; and Rub, Josef, to Mannesmann Rexroth GmbH. Variable capacity vane pump with means to vary the area of overlap. 4,697,990, Cl. 417-204.000.

Dantlgraber, Jorg, to Mannesmann Rexroth GmbH. Rotary pump with adjustable cam ring. 4,697,996, Cl. 418-31.000.

D'Antonio, Nicholas F.; and D'Antonio, Nicholas J. Pressure regulation system. 4,698,060, Cl. 604-320.000.

D'Antonio, Nicholas J.: *See—*
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., 4,698,060, Cl. 604-320.000.

Dao, Le H.: *See—*
Le Van Mao, Raymond; and Dao, Le H., 4,698,452, Cl. 585-640.000.

Darragh, Charles T.; and Parsons, Edward L., Jr., to Solar Turbines Incorporated. Thermally balanced restraint system for a heat exchanger. 4,697,633, Cl. 165-51.000.

Dasa, Madhava. Multiple configuration model aircraft. 4,698,041, Cl. 446-61.000.

D'Atre, John D.: *See—*
Seymour, Robert A.; Ritter, Allen M.; Kellogg, Richard A.; and D'Atre, John D., 4,698,577, Cl. 318-805.000.

Daube, Bruce C., Jr.; Flagan, Richard C.; and Hoffmann, Michael R., to California Institute of Technology. Active cloudwater collector. 4,697,462, Cl. 73-863.210.

Daum, Sol J.; and Lesher, George Y., to Sterling Drug Inc. 1-ethyl-6-fluoro-1,4-dihydro-7-(2,6-dimethyl-4-pyridinyl)-4-oxo-3-quinolinecarboxylic acid and antibacterial use thereof. 4,698,350, Cl. 514-312.000.

Daval, Jacques: *See—*
Armand, Marie-Francoise; Daval, Jacques; Ferrand, Bernard; and Moriceau, Hubert, 4,698,281, Cl. 428-692.000.

David, Constant V. Helicopter blade cyclic pitch control system. 4,697,986, Cl. 416-114.000.

Davies, Donald M., Jr.: *See—*
Hall, Shelby J.; Olekna, David J.; and Davies, Donald M., Jr., 4,698,311, Cl. 436-10.000.

Davis, David R.: *See—*
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.

Davis, Steven S.; Mueller, Max A.; and Janecek, Kenneth F., to Envirotech Corporation. Composite roll covering for expressing machines. 4,697,511, Cl. 100-37.000.

Davis, Walter L., to Motorola, Inc. Programmable read only memory adaptive row driver circuit. 4,698,790, Cl. 365-230.000.

Dawson, Robert H., to Reliance Electric Company. Center barrier for wire gripping devices. 4,698,031, Cl. 439-863.000.

Day, Robert C. Boat dock mooring device. 4,697,538, Cl. 114-230.000.

De la Rue Giori S.A.: *See—*
Germann, Albrecht J., 4,697,515, Cl. 101-179.000.

Dean, James G. Novelty card. 4,697,364, Cl. 40-445.000.

De Boodt, Marcel F. L. P.; De Strooper, Eric B. A.; and Van Meirvenne, Marc R., to Labofina, S.A. Process for consolidating soils. 4,697,961, Cl. 405-264.000.

De Bree, Hans: *See—*
Ruijten, Henri M.; De Bree, Hans; and Van Amsterdam, Peter H., 4,697,428, Cl. 62-124.000.

de Canecaude, Emmanuel. Device for weighing individuals on a toilet seat. 4,697,656, Cl. 177-144.000.

Dechene, Fernand J., to International Oxygen Company, Inc. Control system for fluid absorption systems and the like. 4,698,075, Cl. 55-163.000.

Dedieu, Alain; Lockhart, Campbell; and Jolu, Etienne, to Commissariat a l'Energie Atomique. Competitive immunoassay protocal for targets including lipoproteins and alpha-fetoprotein. 4,698,298, Cl. 435-7.000.

Deere & Company: *See—*
Anstey, Henry D.; Frimml, Roger W.; and Frerich, Josef, 4,697,402, Cl. 53-506.000.

DeFreez, Richard K.: *See—*
Puretz, Joseph; Orloff, Jonathan H.; DeFreez, Richard K.; and Elliott, Richard A., 4,698,129, Cl. 156-643.000.

de Haan, Gerard, to U.S. Philips Corporation. Color television transmission or information storage system, respectively with time-division multiplex coding and data generator and receiver suitable therefor. 4,698,665, Cl. 358-12.000.

de Haas, Maarten A.: *See—*
Hoogendoorn, Thomas M.; de Haas, Maarten A.; and Nijman, Johan M., 4,698,103, Cl. 148-12.00F.

DeJarnette, Edward A., Jr.: *See—*
McCracken, Alan; Dominiani, Frank J., Jr.; and DeJarnette, Edward A., Jr., 4,697,739, Cl. 239-127.000.

Delheusy, Jean C.: *See—*
Le Clerco, Pierre A. L. M. G.; Delheusy, Jean C.; and Rigot, Guy J., 4,697,955, Cl. 405-135.000.

Dellinger, Thomas B., to Mobil Oil Corporation. Method of drilling deviated wellbores. 4,697,651, Cl. 175-61.000.

Delta Technology Corporation: *See—*
Codding, Elias H., 4,697,709, Cl. 209-549.000.

DeLuca, Richard M.: *See—*
Wells, William D.; Robinson, David M.; DeLuca, Richard M.; and Burwen, Eric D., 4,698,509, Cl. 250-492.200.

De Munno, Angela: *See—*
Bertini, Vincenzo; Marabini, Anna; De Munno, Angela; Barbaro, Maria; and Pocci, Marco, 4,698,171, Cl. 252-60.000.

den Boer, Willem; Payson, J. Scott; and Yaniv, Zvi, to Energy Conversion Devices, Inc. Programmable semiconductor switch for a light influencing display and method for making same. 4,698,627, Cl. 340-718.000.

Deneuve, Francoise: *See—*
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,698,175, Cl. 252-182.000.

Dengler, Alfred; and Medler, Eberhard, to Daimler-Benz Aktiengesellschaft. Arrangement for quickly changing nozzles on a spraying apparatus. 4,697,741, Cl. 239-391.000.

Denhez, Alain; Hargoaa, Francis; and Aubree, Jean, to Alcatel. Clock repeater for triplicated clock distributor. 4,698,826, Cl. 375-3.000.

Denlinger, Keith R.: *See—*
Hayes, Earl J.; Cooper, Ralph M.; Denlinger, Keith R.; and Shuey, John R., 4,697,864, Cl. 439-444.000.

Dennis, Timothy A., to RCA Corporation. Method of forming tapered contact openings. 4,698,132, Cl. 156-657.000.

Dentsply Research & Development Corp.: *See—*
Tateosian, Louis; and Roemer, Frederick D., 4,698,373, Cl. 522-95.000.

Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Hettche, Albert; Schneider, Rolf; and Raubenheimer, Hans-Juergen, to BASF Aktiengesellschaft. Additives for detergents and cleaning agents. 4,698,174, Cl. 252-174.240.

Deol, Harbans S.: *See—*
Wong, Show-Chu; Deol, Harbans S.; and Harz, Debra L., 4,698,312, Cl. 436-10.000.

De Regis, Massimo; and Mannucci, Emanuela, to Societa Italo-Brittanica L. Manetti-H. Roberts & Co. 4-methoxy-isophthalic acid derivative having a pharmacological activity in thromboembolic disorders. 4,698,354, Cl. 514-357.000.

Derewonko, Henry: *See—*
Bessonneau, Guy; Carnez, Bernard; Derewonko, Henry; and Lepage, Joel, 4,698,661, Cl. 357-74.000.

Dervan, Andrew H.: *See—*
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,398, Cl. 525-437.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,399, Cl. 525-449.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,400, Cl. 525-450.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,402, Cl. 525-533.000.

Desmond, John P.; Ford, Douglas W.; Fossey, Michael E.; Stanbro, Michael; and Zimmerman, Kenneth A. Method and apparatus for detecting control system data processing errors. 4,698,785, Cl. 364-900.000.

De Strooper, Eric B. A.: *See—*
De Boodt, Marcel F. L. P.; De Strooper, Eric B. A.; and Van Meirvenne, Marc R., 4,697,961, Cl. 405-264.000.

Detzer, Rudiger; Loew, Werner; and Kohnen, Franz, to Kessler + Luch GmbH. Apparatus for humidifying, cleaning and cooling of gases. 4,697,435, Cl. 62-304.000.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co., Ltd. Musical tone generator using incremental harmonic variation. 4,697,490, Cl. 84-1.010.

Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V.: *See—*
Grethe, Klaus; Eickhoff, Heinrich; Goller, Elmar; and Hulsen, Ralf, 4,698,014, Cl. 431-9.000.

DeVaney, David B.; Harper, Donald J.; and Short, Thomas D. Mobile telephone switching office. 4,698,839, Cl. 379-60.000.

Devereux, Corinne: *See*—
Spillert, Charles R.; Devereux, Corinne; and Lazaro, Eric J., 4,698,335, Cl. 514-158.000.

Devi S.p.A.: *See*—
Vismara, Mario, 4,698,001, Cl. 425-4.00R.

Devoucoux, Pierre: *See*—
Foucher, Jean-Claude; and Devoucoux, Pierre, 4,697,634, Cl. 165-76.000.

de Vries, Gerhard: *See*—
Schallmeier, Gunter; and de Vries, Gerhard, 4,698,245, Cl. 428-33.000.

DeWitt, Carl; and Fink, Gerald A. Mowing apparatus. 4,697,405, Cl. 56-10.400.

Diazzi, Claudio: *See*—
Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, 4,698,519, Cl. 307-254.000.

Dick, David A.: *See*—
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,697,718, Cl. 220-82.00R.

Dicker, Ian D.; and Suschitzky, John L., to Fisons plc. Quinoline derivatives and their use as anti-asthmatic agents. 4,698,345, Cl. 514-291.000.

Dickerson, Clifford; and Keithly, David, to Temes Corporation. Power generation system. 4,697,424, Cl. 60-670.000.

Dickirson, Gene D., to Ford Motor Company. Snap lock connector. 4,697,832, Cl. 285-319.000.

Diefenbach, Steven P., to Ethyl Corporation. Dirhenium metathesis catalysts. 4,698,451, Cl. 585-534.000.

Diehl GmbH & Co.: *See*—
Riesner, Gerhard; and Koch, Walther, 4,698,729, Cl. 361-386.000.

Diesel Kiki C., Ltd.: *See*—
Moriya, Koichi; and Oshizawa, Hidekazu, 4,698,762, Cl. 364-424.100.

Diesel Kiki Co., Ltd.: *See*—
Kobayashi, Tadashi; and Nozaki, Shinya, 4,697,565, Cl. 123-449.000.

Diessner, Eberhard; and Zahn, Ulrich, to Volkswagen Aktiengesellschaft. Method and device for filling a fluid friction clutch. 4,697,621, Cl. 141-1.000.

DiFazio, Joseph: *See*—
Moosbrugger, Dennis S.; DiFazio, Joseph; and Watson, David N., 4,697,365, Cl. 40-546.000.

Di Giulio, Peter C., to Pitney Bowes Inc. Monitoring system for verifying that an input signal is toggling at a minimum frequency. 4,698,829, Cl. 377-16.000.

Dijkstra, Albert J.; and Van Opstal, Martin, to Safinco Coordination Center N.V. Process for producing degummed vegetable oils and gums of high phosphatidic acid content. 4,698,185, Cl. 260-403.000.

Dill, David M.; and Redmond, Holly F., to International Business Machines Corp. Terminal procedure for utilizing host processor log on and log off prompts. 4,698,757, Cl. 364-300.000.

Dill, Hans G.: *See*—
Cavicchi, Bruce T.; Dill, Hans G.; and Zemmrich, Dieter K., 4,698,455, Cl. 136-256.000.

Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., to Pneumo Corporation. Dual tandem composite cylinder assembly. 4,697,499, Cl. 92-151.000.

Di Schiena, Michele G. Tris-chydroxymethyl) aminomethane salt of 4-chloro-N-furfuryl-5-sulfamoyl anthranilic acid and diuretic compositions containing the same. 4,698,361, Cl. 514-471.000.

Dively, Lee V.; and Grubbs, Jack M., to Seiscor Technologies, Inc. Coin operated telephone. 4,698,840, Cl. 379-112.000.

Diversco, Inc.: *See*—
Freed, Mark L., 4,697,492, Cl. 84-1.160.

Diversified Products Corp.: *See*—
Rockwell, Gary L., 4,697,809, Cl. 272-118.000.

Dixon, John W.: *See*—
Youtt, Stanley A.; and Dixon, John W., 4,697,618, Cl. 137-587.000.

Do-All Jewelry Mfg. Co., Inc.: *See*—
Geldwerth, Simon, 4,697,315, Cl. 24-616.000.

Dobbs, John M.: *See*—
Kellogg, Edwin M.; Dobbs, John M.; Dunn, Gregory J.; Kaufmann, Henry C.; and Thompson, William, 4,698,236, Cl. 427-43.100.

Doddapaneni, Narayan, to Honeywell Inc. Electrochemical cell having improved active life. 4,698,283, Cl. 429-101.000.

Dodds, John J., to Boeing Company, The. Silicone rubber vacuum bag tool and method of fabricating same. 4,698,115, Cl. 156-382.000.

Doi, Haruo: *See*—
Kamigaito, Osami; Doi, Haruo; and Noda, Shoji, 4,697,325, Cl. 29-447.000.

Doi, Isao: *See*—
Osawa, Izumi; Doi, Isao; and Natsuhara, Toshiya, 4,698,287, Cl. 430-57.000.

Doi, Sadao; Yamada, Tohru; Matsumoto, Shungo; and Yamamoto, Taizo, to Taiyo Tanko Co., Ltd. Cultivator nail supporting structure. 4,697,644, Cl. 172-123.000.

Dokoshi, Noriaki: *See*—
Nakagima, Masashi; Kojima, Hiroshi; Matsui, Tatsuro; and Dokoshi, Noriaki, 4,698,407, Cl. 528-14.000.

Dolabdjian, Barkew: *See*—
Henkel, Eberhard; Dolabdjian, Barkew; Helger, Roland; Klink, Rainer; and Wurzburg, Uwe, 4,698,300, Cl. 435-18.000.

Dolizy, Pierre, to U.S. Philips Corporation. Image dissector tube with light filter. 4,698,496, Cl. 250-213.0VT.

Dominiani, Frank J., Jr.: *See*—
McCracken, Alan; Dominiani, Frank J., Jr.; and DeJarnette, Edward A., Jr., 4,697,739, Cl. 239-127.000.

Domoto, Yasuo: *See*—
Yagi, Takashi; Horii, Yoshiharu; and Domoto, Yasuo, 4,697,942, Cl. 400-208.000.

Don Joy Orthopedic, Inc.: *See*—
Mason, Bradley R.; Mason, Jeffrey T.; and Cawley, Patrick W., 4,697,583, Cl. 128-80.00C.

Donaldson, Ralph W.: *See*—
Gunter, William D., Jr.; Donaldson, Ralph W.; and Anderson, Alma G., Jr., 4,697,922, Cl. 356-28.500.

Dorman, Linneaus C.; and Meyers, Paul A., to Dow Chemical Company, The. Composites of unsintered calcium phosphates and synthetic biodegradable polymers useful as hard tissue prosthetics. 4,698,375, Cl. 523-115.000.

Dorman Products, Inc.: *See*—
Drake, Robert C., 4,698,459, Cl. 174-138.00F.

Dorran Photonics Incorporated: *See*—
Cook, John S., 4,697,871, Cl. 350-96.210.

Douglas, Roy D.: *See*—
Larson, Paul F.; Douglas, Roy D.; Petrofsky, Jerrold S.; and Phillips, Chandler A., 4,697,808, Cl. 272-70.000.

Douglass, Duane: *See*—
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,697,499, Cl. 92-151.000.

Dow Chemical Company, The: *See*—
Anderson, Kenneth W.; and Hickner, Richard A., 4,698,141, Cl. 204-181.700.
Carl, William P.; and Birdwell, Jeffrey D., 4,698,243, Cl. 427-341.000.
Croft, Alan P., 4,698,433, Cl. 548-228.000.
Dorman, Linneaus C.; and Meyers, Paul A., 4,698,375, Cl. 523-115.000.
Klein, Dieter H.; and Koenig, Raymond, 4,698,401, Cl. 525-489.000.
Morris, Gregory J. E.; and Newton, H. Gene, 4,698,143, Cl. 204-253.000.
Wainerdi, Thomas J., 4,698,144, Cl. 204-257.000.

Dow Corning Corporation: *See*—
Lo, Peter Y. K.; and Ziemelis, Maris J., 4,698,406, Cl. 528-12.000.

Drabek, Jozef, to Ciba-Geigy Corporation. Use of 3-acylaminobenzisothiazoles for controlling pests. 4,698,358, Cl. 514-373.000.

Drago, Gary A.; Baier, Walter F.; Lee, Francis C.; Mills, Ross N.; and Mossbrugger, Horst G., to International Business Machines. Drop-on-demand ink jet print head. 4,698,644, Cl. 346-140.00R.

Drake, Robert C., to Dorman Products, Inc. Battery connection protector case. 4,698,459, Cl. 174-138.00F.

Drawert, Manfred; Krase, Horst; and Skoda, Hans D., to Schering Aktiengesellschaft. Hardenable synthetic resin mixtures. 4,698,396, Cl. 525-420.500.

Dronet, Jean-Marc: *See*—
Lemaire, Didier V.; and Dronet, Jean-Marc, 4,697,695, Cl. 198-803.150.

Ducane Company, The: *See*—
Ducate, John S., Jr., 4,697,506, Cl. 99-482.000.

Ducate, John S., Jr., to Ducane Company, The. Tray for generating food flavoring smoke. 4,697,506, Cl. 99-482.000.

Dudar, Thomas E.: *See*—
Makaryk, Walter A.; Dudar, Thomas E.; and Zentz, Mary K., 4,698,061, Cl. 604-408.000.

Duff, Kenneth S., to Durolla Products (N.Z.) Limited. Toilet roll holder and dispenser. 4,697,754, Cl. 242-55.300.

Dumont Holding Company: *See*—
Marcotte, Richard P.; and Dumont, John W., Jr., 4,697,530, Cl. 110-234.000.

Dumont, John W., Jr.: *See*—
Marcotte, Richard P.; and Dumont, John W., Jr., 4,697,530, Cl. 110-234.000.

Dunbar, Richard M.; Wynosky, Charles E.; and Stoiber, Henry E., to Coalair Systems Limited Partnership. Control system for a continuous process venturi accelerated pneumatic pump. 4,697,962, Cl. 406-15.000.

Duncan, Michael, to Balderson Inc. Snubber device for parallelogram grapple. 4,697,840, Cl. 294-119.400.

Dunlop Limited a British Company: *See*—
Bell, Raymond W. H., 4,698,369, Cl. 521-99.000.

Dunn, Gregory J.: *See*—
Kellogg, Edwin M.; Dobbs, John M.; Dunn, Gregory J.; Kaufmann, Henry C.; and Thompson, William, 4,698,236, Cl. 427-43.100.

Duphar International Research B.V.: *See*—
Ruijten, Henri M.; De Bree, Hans; and Van Amsterdam, Peter H., 4,697,428, Cl. 62-124.000.

Du Pont de Nemours, E. I., and Company: *See*—
Anderson, Martin, 4,698,365, Cl. 514-594.000.
Bair, Thomas I., 4,698,414, Cl. 528-339.000.
Blair, Leslie M.; and Conrad, Roddy M., 4,698,440, Cl. 560-205.000.
Blaisdell, Charles T.; Cordes, Walter J.; Heinsohn, George E.; Kook, John F.; and Kosak, John R., 4,698,438, Cl. 558-3.000.
Chou, Richard T., 4,698,392, Cl. 525-189.000.
Crandall, Terry G.; and Chen, Horng-Yih, 4,698,220, Cl. 423-607.000.
Gantzhorn, John E., Jr.; McCloud, John W., II; and Uhler, Robert O., 4,698,701, Cl. 360-16.000.
Grossa, Mario, 4,698,293, Cl. 430-291.000.

Hasircoglu, Alexander W., 4,697,862, Cl. 439-404.000.
Klabunde, Ulrich, 4,698,403, Cl. 526-126.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,398, Cl. 525-437.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,399, Cl. 525-449.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,400, Cl. 525-450.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,402, Cl. 525-533.000.
Lau, Tit-Kueng; and Cohen, Abraham B., 4,698,294, Cl. 430-325.000.
Lee, Jerald D., 4,698,649, Cl. 346-108.000.
Lynch, Charles E.; and Wilkinson, William K., 4,698,413, Cl. 525-328.500.
McClure, George R.; and Vassiliou, Eustathios, 4,698,382, Cl. 524-292.000.
Moss, Arthur Z., 4,698,372, Cl. 521-145.000.
Nelson, Thomas L., 4,697,317, Cl. 28-258.000.
Tokarsky, Edward W., 4,698,267, Cl. 428-474.400.
Vassiliou, Eustathios, 4,698,110, Cl. 156-231.000.
Verhoeven, Laurentius M., 4,697,339, Cl. 29-828.000.

Durkee, Darryl L.; Manning, Frank E.; and Gilliam, Frank D. Tongue force measuring device. 4,697,601, Cl. 128-777.000.

Durkee Industrial Foods, Corp.: *See—*
Steinke, James A., 4,698,264, Cl. 428-402.200.

Durolla Products (N.Z.) Limited: *See—*
Duff, Kenneth S., 4,697,754, Cl. 242-55.300.

Dutertre-Laduree, Daniel: *See—*
Roos, Andre; Dutertre-Laduree, Daniel; Goldman, Max; and Goldman, Alice, 4,698,586, Cl. 324-71.100.

Duthaler, Rudolf: *See—*
Pfeifer, Josef; and Duthaler, Rudolf, 4,698,295, Cl. 430-325.000.

Dutkanych, Thomas A., to Hamilton, Howard D.; and Hamilton, Laura M. Bin with retractable lid. 4,697,836, Cl. 294-68.200.

Duval, Paul A., to Guilford Mills, Inc. Differential density fabric. 4,698,276, Cl. 428-116.000.

Dyer, Gerald E.: *See—*
Babcock, Stephen G.; Dyer, Gerald E.; and Gordon, Stephen S., 4,698,484, Cl. 219-130.010.

Dynamit Nobel Aktiengesellschaft: *See—*
Penner, Horst; and Jensen, Ernst, 4,697,524, Cl. 102-498.000.

Dynapac Mfg. Inc.: *See—*
Tuneblom, Eskil, 4,697,850, Cl. 299-87.000.

Dyott, Richard B., to Andrew Corporation. Fiber-optic rotation sensor. 4,697,876, Cl. 350-96.290.

E.M.M. Emiliana Macchine Maglieria S.r.l.: *See—*
Stoppazzini, Benito, 4,697,439, Cl. 66-149.00R.

E.P. Remy & Cie: *See—*
Lemaire, Didier V.; and Dronet, Jean-Marc, 4,697,695, Cl. 198-803.150.

E-Z Machine Corp.: *See—*
Lowe, William F., 4,698,114, Cl. 156-353.000.

Earl, Geoffrey H.: *See—*
Aldrich, Robert G.; Earl, Geoffrey H.; and Trunko, David W., 4,698,289, Cl. 430-106.600.

Easterling, Teddy G. Apparatus for splicing magnetic tape. 4,698,119, Cl. 156-506.000.

Eastman Christensen: *See—*
Kruger, Volker; and Hense, Ulrich, 4,698,794, Cl. 367-83.000.

Eastman Christensen Company: *See—*
Peterson, Lynn, 4,697,653, Cl. 175-329.000.

Eastman Kodak Company: *See—*
Moore, William H.; Weaver, Max A.; and Lum, Kin K., 4,698,651, Cl. 503-227.000.
Yacobucci, Paul D.; and Albano, Thomas, 4,698,391, Cl. 525-162.000.

Eastman, Robert A.; Rugland, Larry D.; and Monsrud, Edwin M., to Polaris Industries, Inc. Recreational vehicle with air cooled transmission. 4,697,665, Cl. 180-230.000.

Eaton Corporation: *See—*
Gale, Allan R.; and Gritter, David J., 4,698,562, Cl. 318-254.000.
Koehler, Randal W., 4,698,612, Cl. 337-320.000.
Kolze, Lawrence A.; Pick, James M.; and Swanson, Wesley S., 4,697,608, Cl. 137-1.000.
Piber, Earl T., 4,698,471, Cl. 200-302.200.
Pick, James M., 4,698,610, Cl. 335-281.000.
Smyth, Robert R., 4,698,763, Cl. 364-424.100.
Zumbusch, Steven J., 4,697,998, Cl. 418-61.00B.

Ebara Corporation: *See—*
Nishimori, Shinji, 4,697,746, Cl. 241-46.00B.

Ebara, Katsuya: *See—*
Matsuzaki, Harumi; Kubota, Masayoshi; Ebara, Katsuya; Takahashi, Sankichi; and Kuroiwa, Minoru, 4,698,153, Cl. 210-192.000.

Eckardt, Hartmann: *See—*
Nussbaumer, Manfred; Glaser, Eberhard; Beitinger, Eberhard; and Eckardt, Hartmann, 4,697,953, Cl. 405-128.000.

Ed. Zublin Aktiengesellschaft: *See—*
Nussbaumer, Manfred; Glaser, Eberhard; Beitinger, Eberhard; and Eckardt, Hartmann, 4,697,953, Cl. 405-128.000.

Edson, Sydney, to Sara Lee Corporation. Support frame for a display carton. 4,697,776, Cl. 248-311.200.

Eguchi, Masaharu; and Kiuchi, Masayoshi, to Canon Kabushiki Kaisha. Display device for a camera. 4,697,900, Cl. 354-215.000.

Ehlers, Claus; and Schoening, Josef, to Hochtemperatur-Reaktorbau GmbH. Gas-cooled nuclear reactor with a bed of spherical fuel elements. 4,698,203, Cl. 376-343.000.

Ehrfeld, Wolfgang; Maner, Asim; and Munchmeyer, Dietrich, to Kernforschungszentrum Karlsruhe GmbH. Method for producing deep-etch, X-ray lithography masks. 4,698,285, Cl. 430-5.000.

Eichinger, Johann, to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co. Drive unit for a rail vehicle. 4,697,527, Cl. 105-133.000.

Eichler, Kenneth M.: *See—*
Mandel, Alan F.; Eichler, Kenneth M.; Trosky, William J.; and Moore, William H., 4,698,780, Cl. 364-550.000.

Eickhoff, Heinrich: *See—*
Grethe, Klaus; Eickhoff, Heinrich; Goller, Elmar; and Hulsen, Ralf, 4,698,014, Cl. 431-9.000.

Eida, Tsuyoshi: *See—*
Ozawa, Kunitaka; Haruta, Masahiro; Eida, Tsuyoshi; and Hamamoto, Takashi, 4,698,151, Cl. 210-96.100.

Eisai Co., Ltd.: *See—*
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, 4,698,336, Cl. 514-202.000.

El-Allawy, Mohammed, to Fried Krupp GmbH. Process for the continuous production of boiler feed water. 4,698,136, Cl. 203-11.000.

Eldering, Charles A.: *See—*
Burns, Daniel J.; Eldering, Charles A.; and Pronobis, Mark T., 4,698,587, Cl. 324-73.00R.

Electro-Pneumatic-International GmbH: *See—*
Huber, Thomas, 4,697,694, Cl. 198-782.000.

Electro Sprayer Systems, Inc.: *See—*
Wensel, Neil D.; Norris, Gary E.; and Beierwaltes, Craig G., 4,698,767, Cl. 364-471.000.

Electronic Engineering and Manufacturing, Inc.: *See—*
Mackie, Gregory C.; Satra, Stephen E.; and Chen, Chih-Ming, 4,698,842, Cl. 381-1.000.

Electronique Serge Dassault: *See—*
Gaucher, Michel M., 4,697,726, Cl. 225-100.000.

Eli Lilly and Company: *See—*
Bassett, Gregory S.; and Bollman, Robert L., 4,698,116, Cl. 156-423.000.
Katner, Allen S., 4,698,338, Cl. 514-206.000.
Mabe, James A.; and Nakatsukasa, Walter M., 4,698,307, Cl. 435-253.000.
Nagarajan, Ramakrishnan; and Schabel, Amelia A., 4,698,327, Cl. 514-8.000.
Schaus, John M.; and Titus, Robert D., 4,698,347, Cl. 514-293.000.

Elias, Lorne, to Canadian Patents and Development Limited. Trace vapor concentrator. 4,698,071, Cl. 55-28.000.

Eliason, Jay R.; and Eliason, Valerie L. C., to United States of America, Energy. Process for structural geologic analysis of topography and point data. 4,698,759, Cl. 364-420.000.

Eliason, Valerie L. C.: *See—*
Eliason, Jay R.; and Eliason, Valerie L. C., 4,698,759, Cl. 364-420.000.

Eliscu, Mark: *See—*
Amstutz, Stanford R.; Eliscu, Mark; and Haselton, E. Fletcher, 4,698,799, Cl. 370-58.000.

Elliott, Richard A.: *See—*
Puretz, Joseph; Orloff, Jonathan H.; DeFreez, Richard K.; and Elliott, Richard A., 4,698,129, Cl. 156-643.000.

Ellis, George S., to Kinetico, Inc. Filter apparatus. 4,698,164, Cl. 210-739.000.

Ellis, Wilbert E.: *See—*
Niggemann, Richard E.; and Ellis, Wilbert E., 4,697,427, Cl. 62-119.000.

Ellison, John R., Jr.: *See—*
Krohn, David A.; Maack, David R.; Vinarub, Edmond I.; and Ellison, John R., Jr., 4,698,616, Cl. 340-347.00P.

Ellsberg, Thomas R., to American Locker Group Incorporated. Security system. 4,698,630, Cl. 340-825.310.

Eltoukhy, Atef, to Trimedia Corporation. Pallet-loading system. 4,697,974, Cl. 414-331.000.

EMA Company: *See—*
Gulgielmo, Richard J., Sr., 4,698,097, Cl. 106-15.050.

Emco Wheaton, Inc.: *See—*
Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., 4,697,624, Cl. 141-208.000.

Emerson Electric Co.: *See—*
Hildebrandt, Eugene F.; and Ottersbach, Thomas V., 4,697,860, Cl. 439-374.000.
Johnson, Harold R., III; Phillips, Allyn E.; Carrigan, Erwin R.; Virgo, Richard A.; and Mickelson, James E., 4,697,675, Cl. 192-7.000.
Welch, Richard E.; and Newman, Robert L., 4,698,614, Cl. 338-22.00R.

Emery, Franklin T.: *See—*
Gonzalez, Avelino J.; Murphy, Franklin J.; Emery, Franklin T.; Weyant, Perry A.; and Craig, William G., 4,698,756, Cl. 364-557.000.

Emhart Industries, Inc.: *See—*
Cole, Ronald E., 4,697,432, Cl. 62-233.000.
Hirt, Walter, 4,698,087, Cl. 65-172.000.
Matievic, Miroslav, 4,697,932, Cl. 368-255.000.

EMI Limited: *See—*
Johnson, Nigel, 4,698,673, Cl. 358-140.000.

Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, to

Mitsubishi Yuka Badische Co., Ltd. Methods of producing molded products from foamed polypropylene particles. 4,698,191, Cl. 264-50.000.

Endo, Mamoru: *See—*
Mitani, Tadayuki; Endo, Mamoru; and Hiramoto, Takashi, 4,698,441, Cl. 562-531.000.

Endo, Takashi: *See—*
Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; and Endo, Takashi, 4,698,650, Cl. 346-134.000.

Endo, Yoichi; and Masaki, Kazumi, to Hayashibara, Ken. Electromagnetic vibration generator. 4,697,581, Cl. 128-41.000.

Endo, Yukio; Harada, Nozomu; and Yoshida, Okio, to Kabushiki Kaisha Toshiba. Image-sensing system with noise eliminator. 4,698,686, Cl. 358-213.180.

Energy Conversion Devices, Inc.: *See—*
den Boer, Willem; Payson, J. Scott; and Yaniv, Zvi, 4,698,627, Cl. 340-718.000.
Keem, John E.; and Marshall, Gerald F., 4,698,833, Cl. 378-84.000.
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi C.; Fournier, Jeffrey; and Kulman, James, 4,698,234, Cl. 427-39.000.
Yu, Terry T.; and Yen, Mei-Rong, 4,698,184, Cl. 260-396.00R.

Engbert, Theodor; Knofel, Hartmut; and Wegener, Gerhard, to Bayer Aktiengesellschaft. Isocyanato-isocyanurate derivatives. 4,698,424, Cl. 544-222.000.

Engdahl, Bernard. Container for fragile food substance. 4,697,707, Cl. 206-585.000.

Engenics, Inc.: *See—*
Bailey, Richard B.; Joshi, Dilip K.; Michaels, Stephen L.; and Wisdom, Richard A., 4,698,303, Cl. 435-139.000.

England, David G.: *See—*
Hubbins, Stephen J.; England, David G.; Szczepanek, Andre; and Norvall, David, 4,698,753, Cl. 364-200.000.

English Electric Valve Company Limited: *See—*
Maitland, Arthur; Menown, Hugh; Strudwick, Ian A.; Weatherup, Clifford R.; and Carman, Robert J., 4,698,546, Cl. 313-446.000.

English, Philip H.; and Szpak, Anthony D. Apparatus for making varied strength beverages. 4,697,502, Cl. 99-299.000.

Enison, Brent M., to Prestige Skirting and Tablecloths Inc. Installment system for table skirting. 4,698,117, Cl. 156-486.000.

Eno, Julius R., Jr.: *See—*
Kobayashi, Masayasu; and Eno, Julius R., Jr., 4,698,550, Cl. 313-618.000.

Entwistle, Brian; Roberts, Peter; and Rogerson, John M., to British Aerospace PLC. Industrial processing and manufacturing systems. 4,698,766, Cl. 364-468.000.

Envirotech Corporation: *See—*
Davis, Steven S.; Mueller, Max A.; and Janecek, Kenneth F., 4,697,511, Cl. 100-37.000.

Eotec Corp: *See—*
Krohn, David A.; Maack, David R.; Vinarub, Edmond I.; and Ellison, John R., Jr., 4,698,616, Cl. 340-347.00P.

Era, Masashi: *See—*
Ishihara, Joo; Ogawa, Toshio; Era, Masashi; and Sato, Ken-ichi, 4,697,320, Cl. 29-132.000.

Erdel, Karlheinz, to Siemens Aktiengesellschaft. Arrangement for correcting burst errors in shortened cyclical block codes. 4,698,813, Cl. 371-40.000.

Ergonomen HB: *See—*
Ohman, Gerth, 4,697,314, Cl. 24-132.00R.

Ernst, William R.: *See—*
Myerson, Allan S.; and Ernst, William R., 4,698,321, Cl. 502-25.000.

Erratico, Pietro: *See—*
Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, 4,698,519, Cl. 307-254.000.

Esgro, Michael; and Jurczynski, Myron. Linear crab trapping device. 4,697,381, Cl. 43-100.000.

Espagnacq, Andre; and Sauvestre, Gerard D., to Etat Francais. Method for opaquing visible and infrared radiance and smoke-producing ammunition which implements this method. 4,697,521, Cl. 102-334.000.

Essex Group, Inc.: *See—*
Juzswik, David L.; Webb, Nathaniel; and Floyd, William M., 4,698,748, Cl. 364-200.000.

Etablissement Oksman S. A. R. L.: *See—*
Garcia, Edgard, 4,698,671, Cl. 358-111.000.

Etat Francais: *See—*
Espagnacq, Andre; and Sauvestre, Gerard D., 4,697,521, Cl. 102-334.000.
Vega, Jean F.; and Morand, Philippe C., 4,698,108, Cl. 149-21.000.

Ethyl Corporation: *See—*
Diefenbach, Steven P., 4,698,451, Cl. 585-534.000.
Kolich, Charles H.; and Klobucar, W. Dirk, 4,698,439, Cl. 558-80.000.
Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., 4,698,380, Cl. 524-2.000.

Eto, Yoshizumi; Umemoto, Masuo; Kanada, Hidehiro; and Mita, Seiichi, to Hitachi, Ltd.; and Hitachi Denshi Kabushiki Kaisha. Method and apparatus for generating error correction codes for digitized picture signal recording/reproducing. 4,698,811, Cl. 371-38.000.

Evans, Gary K.: *See—*
Evans, Willie V.; and Evans, Gary K., 4,697,465, Cl. 73-866.500.

Evans, John M.; and Wise, Colin C. Method and apparatus for measuring blood oxygen levels. 4,697,593, Cl. 128-634.000.

Evans, Neil A.; Milligan, Brian; and Waters, Peter J., to Commonwealth Scientific and Industrial Research Org. Use of sulfonated 2-(2'-hydroxyaryl)-s-triazines as photostabilizing agents for wool and other protein fibres. 4,698,064, Cl. 8-128.00R.

Evans, Wallace; and Redman, Gary M., to GTE Sprint Communications Corp. Adjustment device for platform mounted horn antenna. 4,698,641, Cl. 343-882.000.

Evans, Willie V.; and Evans, Gary K. Test coupon holder. 4,697,465, Cl. 73-866.500.

Exel Microelectronics, Inc.: *See—*
Mukherjee, Satyen; and Chang, Thomas, 4,698,787, Cl. 365-185.000.

Exxon Chemical Patents Inc.: *See—*
Storey, William R.; Wheat, William R.; Smith, Stuart B.; and Ajinkya, Milind B., 4,698,211, Cl. 422-135.000.

Exxon Production Research Company: *See—*
Cunningham, Allen B., 4,698,791, Cl. 367-25.000.
Kirby, Robert A., 4,697,667, Cl. 181-113.000.

Exxon Research and Engineering Company: *See—*
Ho, Teh C.; Chianelli, Russell R.; Jacobson, Allan J.; and Young, Archie R., 4,698,145, Cl. 208-18.000.
Nuttens, Hugo J. C.; and VanHaeren, Gerard, 4,698,450, Cl. 585-520.000.

F. L. Smidth & Co. A/S: *See—*
Taarning, Claus E., 4,698,719, Cl. 361-87.000.
Trelby, Ib V., 4,697,747, Cl. 241-54.000.
West, Henrik, 4,697,686, Cl. 193-23.000.

Faber, Ernst, to Walter Just Gesellschaft m.b.H. Belt stamp. 4,697,513, Cl. 101-111.000.

Faber, Johannes W.; and Janssen, Peter J. M., to U.S. Philips Corporation. Device for translating a slide. 4,698,798, Cl. 369-219.000.

Faber, Joseph; and Myers, Paul, to Sundstrand Corporation. Fluid operated disconnect coupling. 4,697,680, Cl. 192-86.000.

Fabian, Ellis, to Xerox Corporation. Method and apparatus for extruding creaseless thin walled tubes. 4,698,196, Cl. 264-565.000.

Fabrica d'Armi P.Beretta S.p.A.: *See—*
Beretta, Pier G., 4,697,495, Cl. 89-143.000.

Fabyan, Joseph: *See—*
Kerns, John A.; Stone, Roger R.; and Fabyan, Joseph, 4,698,197, Cl. 376-142.000.

Fachat, Gaston; Sistermann, Klaus; and Ungerer, Heinz-Jurgen, to Grunzweig & Hartmann und Glasfaser AG. Apparatus for producing mineral fibres from molten silicate by blast drawing. 4,698,086, Cl. 65-16.000.

Faircloth, F. Craige. Screen means. 4,697,326, Cl. 29-448.000.

Fantoni Arredamenti S.p.A.: *See—*
Lucci, Roberto; and Orlandini, Paolo, 4,697,846, Cl. 297-298.000.

Fanuc Ltd.: *See—*
Nakashima, Seiichiro; Toyoda, Kenichi; Sakakibara, Shinsuke; and Torii, Nobutoshi, 4,697,979, Cl. 414-786.000.
Toyoda, Kenichi; Sakakibara, Shinsuke; Mizuno, Tooru; and Hara, Ryuichi, 4,698,777, Cl. 364-513.000.

Farrenkopf, Bruce C.; and Kaufman, Richard A., to Hoffmann-La Roche Inc. Method and kit for determining total digoxin levels involving agent to dissociate digoxin-protein complex. 4,698,315, Cl. 436-536.000.

Fassman, Arnold; and Salancy, William, to Pitney Bowes Inc. Inking apparatus for a mailing machine. 4,697,517, Cl. 101-348.000.

Faulkner, Stephen L.: *See—*
Buchanan, Sabern D.; and Faulkner, Stephen L., 4,698,561, Cl. 318-87.000.

Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. Use of substituted malonic acid derivatives as agents for combating pests. 4,698,333, Cl. 514-63.000.

Favorite Manufacturing, Inc.: *See—*
Martin, Eugene G.; and Martin, Harold C., 4,697,307, Cl. 17-11.000.

Fay, Bernard: *See—*
Northrup, Ronnie; and Fay, Bernard, 4,698,834, Cl. 378-34.000.

Fehr, Erwin; and Schaefer, Andreas, to Wild Heerbrugg AG. Microscope with a binocular tube. 4,697,893, Cl. 350-516.000.

Feinberg, David A., to University of California, The Regents of the. MRI of chemical shift spectra within limited inner volume. 4,698,592, Cl. 324-309.000.

Feldman, Neil: *See—*
Nichols, William E.; Herzog, William F.; Feldman, Neil; and Laumeister, William, 4,698,664, Cl. 358-10.000.

Feller, Wolfgang: *See—*
Schmidt, Karl-Heinz; and Feller, Wolfgang, 4,698,387, Cl. 525-54.100.

Fellows, Mark W.: *See—*
Stupp, Edward H.; and Fellows, Mark W., 4,698,554, Cl. 315-307.000.

Feniou, Claude: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Pontagnier, Henri; and Prat, Gisele, 4,698,343, Cl. 514-255.000.

Fenske, Dale. Bait container. 4,697,380, Cl. 43-55.000.

Ferag AG: *See—*
Gerber, Walter, 4,697,400, Cl. 53-118.000.

Ferguson, Arthur R., to Outboard Marine Corporation. Marine propulsion device hydraulic system. 4,698,035, Cl. 440-61.000.

Ferrand, Bernard: *See—*
Armand, Marie-Francoise; Daval, Jacques; Ferrand, Bernard; and Moriceau, Hubert, 4,698,281, Cl. 428-692.000.

Ferraro, Frank A., to Warner Lambert Company. Cap for razor blade assembly adapted to receive an extra element. 4,697,342, Cl. 30-41.000.

Fesler, Kenneth A.: *See—*
Youngquist, Robert C.; Brooks, Janet L.; Fesler, Kenneth A.; Cutler, Cassius C.; and Shaw, Herbert J., 4,697,926, Cl. 356-345.000.
Feth, Max: *See—*
Lenk, Erich; and Feth, Max, 4,698,008, Cl. 425-192.00S.
Fiddler, R. Charles: *See—*
Chandler, Michael S.; and Fiddler, R. Charles, 4,697,429, Cl. 62-203.000.
Finaurini, Roberto, to SGS Microelettronica S.p.A. Dynamic protection integrated device, in particular for MOS input stages integrated circuits. 4,698,720, Cl. 361-91.000.
Findeisen, Kurt: *See—*
Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.
Fink, Gerald A.: *See—*
DeWitt, Carl; and Fink, Gerald A., 4,697,405, Cl. 56-10.400.
Fink, Karl. Melting furnace. 4,697,792, Cl. 266-248.000.
Finley, Joseph H.; Severns, Richard R.; and Zakotnik, Robert M., to FMC Corporation. Formcoke having modified bituminous binder. 4,698,067, Cl. 44-15.00B.
Finney, James E.; and Brubaker, Weldon L., to Molex Incorporated. Method of manufacturing a carrier assembly. 4,697,340, Cl. 29-862.000.
Finney, James L.: *See—*
Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., 4,697,730, Cl. 228-37.000.
Fire-Fox International, Inc.: *See—*
Caraway, Miles F.; and Caraway, Bobby L., 4,697,639, Cl. 166-82.000.
Firey, Joseph C. Cyclic gas with solid reaction plant. 4,698,069, Cl. 48-61.000.
Fischell, Robert E.: *See—*
Swift, William; and Fischell, Robert E., 4,697,622, Cl. 141-1.000.
Fischer, Kurt F., to General Motors Corporation. Flexible part-centering pneumatic gripper. 4,697,839, Cl. 294-115.000.
Fisher, Robert L., Jr., to AMP Incorporated. Floating coaxial connector. 4,697,859, Cl. 439-246.000.
Fisher Scientific Company: *See—*
Wong, Show-Chu; Deol, Harbans S.; and Harz, Debra L., 4,698,312, Cl. 436-10.000.
Fishing Designs, Inc.: *See—*
Brackett, John E.; and Dahlberg, Larry J., 4,697,376, Cl. 43-23.000.
Fisons plc: *See—*
Dicker, Ian D.; and Suschitzky, John L., 4,698,345, Cl. 514-291.000.
Fite, F. Bartow: *See—*
Holcomb, David A.; and Tryon, James A., 4,697,749, Cl. 241-169.000.
Flagan, Richard C.: *See—*
Daube, Bruce C., Jr.; Flagan, Richard C.; and Hoffmann, Michael R., 4,697,462, Cl. 73-863.210.
Flaherty, John M., to GTE Products Corporation. Fluorescent lamps having improved lamp spectral output and maintenance and method of making same. 4,698,239, Cl. 427-67.000.
Flakas, Gerald K.: *See—*
Pajerski, Michael J.; Gray, Steven J.; Flakas, Gerald K.; and Cotic, Dennis J., 4,697,661, Cl. 180-6.500.
Flakt Aktiebolag: *See—*
Peltola, Heikki, 4,698,077, Cl. 55-204.000.
Flannagan, Stephen T.; Reed, Paul A.; and Barnes, John, to Motorola, Inc. Memory architecture with sub-arrays. 4,698,788, Cl. 365-205.000.
Flexible Manufacturing Systems, Inc.: *See—*
Koch, George R.; Krolak, Michael; and Biche, Michael R., 4,698,775, Cl. 364-478.000.
Flores, Christopher; and Gopinath, Bhaskarpillai, to Telephone and Telegraph Company, AT&T Bell Labs. Shared data transmission system. 4,698,804, Cl. 370-86.000.
Flow Industries, Inc.: *See—*
Blackwelder, Ron F.; Gad-el-Hak, Mohamed; and Srnsky, Randy A., 4,697,769, Cl. 244-199.000.
Floyd, William M.: *See—*
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FMC Corporation: *See—*
Finley, Joseph H.; Severns, Richard R.; and Zakotnik, Robert M., 4,698,067, Cl. 44-15.00B.
McCracken, Alan; Dominiani, Frank J., Jr.; and DeJarnette, Edward A., Jr., 4,697,739, Cl. 239-127.000.
Tye, Richard J.; Lauterbach, George E.; and Standel, Philip R., 4,698,172, Cl. 252-70.000.
Fochtman, Edward G.; and Swanstrom, Carl P., to Chemical Waste Management, Inc. Waste material compression tester. 4,697,457, Cl. 73-820.000.
Foggles, Inc.: *See—*
Gilson, Richard D., 4,698,022, Cl. 434-36.000.
Fontenot, John E., to NL Industries, Inc. Method for estimating formation characteristics of the exposed bottomhole formation. 4,697,650, Cl. 175-50.000.
Ford Aerospace & Communications Corporation: *See—*
Parvin, Bahram A., 4,698,751, Cl. 364-200.000.
Ford, Douglas W.: *See—*
Desmond, John P.; Ford, Douglas W.; Fossey, Michael E.; Stanbro, Michael; and Zimmerman, Kenneth A., 4,698,785, Cl. 364-900.000.
Ford Motor Company: *See—*
Dickirson, Gene D., 4,697,832, Cl. 285-319.000.
Forkner, John F., to Baxter Travenol Laboratories, Inc. Scanning microtelescope for surgical applications. 4,697,577, Cl. 128-6.000.
Formax, Inc.: *See—*
Sandberg, Glenn A., 4,697,308, Cl. 17-32.000.
Forner, Siegfried: *See—*
Gugel, Siegfried; Pellkofer, Dieter; and Forner, Siegfried, 4,698,474, Cl. 219-60.00A.
Fort, Jacques, to Les Applications Industrielles Vosiennes ("S.A.P.I.V.-.O.G"). Gripper for textile layer or the like. 4,697,837, Cl. 294-88.000.
Fortel, Inc.: *See—*
Kilstofte, Richard B., 4,698,706, Cl. 360-96.400.
Forterre, Gerard; and Guerin, Bernard, to Thomson-CSF. Nonreciprocal microwave device for surface waves and an isolator having high isolation for the utilization of said device. 4,698,604, Cl. 333-24.200.
Fory, Werner: *See—*
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Fossey, Michael E.: *See—*
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Foster, George T.: *See—*
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Foucher, Jean-Claude; and Devoucoux, Pierre, to Stein Industrie. Device for fixing a perforated sheet against the perforated tube plate of a heat exchanger. 4,697,634, Cl. 165-76.000.
Fournier, Jeffrey: *See—*
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi C.; Fournier, Jeffrey; and Kulman, James, 4,698,234, Cl. 427-39.000.
Fox, Charles, to Showscan Film Corporation. Electronic projector. 4,697,896, Cl. 352-180.000.
Fox, Jeffrey D.: *See—*
Wickham, John L.; Fox, Jeffrey D.; and Miller, Ross C., 4,697,318, Cl. 29-33.00P.
Wickham, John L.; and Fox, Jeffrey D., 4,697,799, Cl. 269-32.000.
Franz, Peter: *See—*
Wehrli, Werner; and Franz, Peter, 4,698,378, Cl. 523-318.000.
Fratello, Vincent J.: *See—*
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Freed, Mark L., to Diversco, Inc. Stringed musical instruments with magnetic pickups. 4,697,492, Cl. 84-1.160.
Frerich, Josef: *See—*
Anstey, Henry D.; Frimml, Roger W.; and Frerich, Josef, 4,697,402, Cl. 53-506.000.
Freyer, Hendrik, to Haagexport, B.V. Device for carrying and closing bags. 4,697,312, Cl. 24-30.50S.
Fricker, Robert, to Stopinc Aktiengesellschaft. Tensioning structure for a sliding closure unit. 4,697,723, Cl. 222-600.000.
Fried, David L., to D. L. Fried Associates, Inc. Method and apparatus for measuring distance utilizing binocular optics. 4,698,493, Cl. 250-204.000.
Fried Krupp GmbH: *See—*
El-Allawy, Mohammed, 4,698,136, Cl. 203-11.000.
Grotkasten, Klaus, 4,698,002, Cl. 425-28.00R.
Frimml, Roger W.: *See—*
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Frisoli, David M. Chamber indicator for a revolver or a hand-held gun. 4,697,366, Cl. 42-1.050.
Fritsch, Horst: *See—*
Bocker, Jurgen; Luther, Hans W.; Wallow, Peter; and Fritsch, Horst, 4,697,525, Cl. 102-518.000.
Fritsch, Joseph F., to Fritsch, Roxanne Yvonne. Cleaning device. 4,698,712, Cl. 360-128.000.
Fritsch, Roxanne Yvonne: *See—*
Fritsch, Joseph F., 4,698,712, Cl. 360-128.000.
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Fry, Richard L.; and Beaumont, Richard J., to Crosfield Electronics (USA) Limited. Radiation generating apparatus and method. 4,698,692, Cl. 358-299.000.
Fuchs, Helmut, to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft. Apparatus for making a yarn. 4,697,412, Cl. 57-401.000.
Fuchs, Werner; and Rebeaud, Jean-Claude, to Bobst SA. Device for preparing a cutting tool. 4,697,338, Cl. 29-799.000.
Fugleberg, Sigmund P.; and Poijarvi, Jaakko I., to Outokumpu Oy. Hydrometallurgical method for treating valuable metal raw materials containing chlorides and fluorides. 4,698,139, Cl. 204-112.000.
Fuji Electric Co., Ltd.: *See—*
Kato, Toshiaki; Ueno, Masakazu; and Nishiura, Masaharu, 4,698,494, Cl. 250-211.00R.
Fuji Jukogyo Kabushiki Kaisha: *See—*
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Ikeda, Mitsuru, 4,698,308, Cl. 435-291.000.
Koda, Takao; Ichii, Hirokazu; and Komatuzaki, Hiroshi, 4,697,903, Cl. 354-288.000.
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Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, 4,697,902, Cl. 354-281.000.
Miyake, Izumi, 4,698,702, Cl. 360-33.100.
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Sato, Yoshimitsu; Ohtsuka, Shuichi; Kimura, Akinori; Yoda, Akira; Kato, Keishi; and Takahashi, Isoji, 4,697,912, Cl. 355-3.00R.

Fujibayashi, Kazuo; Tsunekawa, Tokuichi; and Ohmura, Hiroshi, to Canon Kabushiki Kaisha. Photographic apparatus. 4,697,905, Cl. 354-406.000.

Fujii, Masahiro; Kamada, Minoru; and Matsubara, Shigeharu, to Nippon Steel Corporation. Process for treating industrial wastewaters by activated sludge. 4,698,158, Cl. 210-610.000.

Fujii, Takao: *See*—
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Fujikawa, Tetsuzo; Hirata, Makizo; Tamba, Shinichi; and Fukui, Noboru, to Kawasaki Jukogyo Kabushiki Kaisha. Valve gear for four-cycle engine. 4,697,555, Cl. 123-90.230.

Fujiki, Yutaka, to Kabushiki Kaisha Toshiba. Emission computed tomography apparatus. 4,698,506, Cl. 250-363.00S.

Fujimoto, Tetsuo, to Toshiba Silicone Company, Ltd. Polyorganosiloxane compositions. 4,698,386, Cl. 524-862.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Kitaura, Yoshihiko; Oku, Teruo; Hirai, Hideo; Yamamoto, Tosiyuki; and Hashimoto, Masashi, 4,698,349, Cl. 514-306.000.
Takaya, Takao; Takasugi, Hisashi; Tsuji, Kiyoshi; and Chiba, Toshiyuki, 4,698,337, Cl. 514-206.000.
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Fujita, Hiroshi: *See*—
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Fujitsu Limited: *See*—
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Asami, Fumitaka, 4,698,529, Cl. 307-542.000.
Hatano, Takashi; Nara, Takashi; Kawato, Yutaka; and Okada, Sumie, 4,698,801, Cl. 370-58.000.
Hideshima, Osamu; and Goto, Hiroshi, 4,698,127, Cl. 156-643.000.
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Koshino, Minoru; and Matsumoto, Yasuo, 4,698,754, Cl. 364-200.000.
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Fujiwara, Hisashige: *See*—
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Fujiwara, Kiyoshi: *See*—
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Fujiwara, Sigemi: *See*—
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Fukuda, Hideo; Ogawa, Takahira; and Fujii, Takao, to Hideo Fukuda. Method for producing hydrocarbon mixtures. 4,698,304, Cl. 435-166.000.

Fukuda, Masao: *See*—
Kikuchi, Uhee; Nozaki, Hiroyoshi; Fukuda, Masao; and Satake, Toshihiko, 4,698,005, Cl. 425-163.000.

Fukuda, Moritoshi, to Nifco Inc. Pivotal coupling device. 4,697,948, Cl. 403-71.000.

Fukuda, Yasushi; Oka, Takafumi; and Tanaka, Kazuo, to Hitachi, Ltd. Data recording and reproducing system with error correction capability using ECC and CRC codes. 4,698,810, Cl. 371-38.000.

Fukuda, Yasutaka; Shimizu, Shigeo; and Nakano, Atsushi, to Victor Company of Japan, Limited. Magnetic recording medium and method of producing the same. 4,698,251, Cl. 428-64.000.

Fukui, Noboru: *See*—
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Fukuoka, Tatsuhiko: *See*—
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Furukawa, Toshiharu; Shimura, Susumu; Takai, Fumio; Sano, Norio; and Ishida, Tomonobu, to Daido Tokushuko Kabushikikaisha. Operating method for a refuse processing furnace. 4,697,532, Cl. 110-346.000.

Furukawa, Yoshimi: *See*—
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GAF Corporation: *See*—
Lewis, David F., 4,698,296, Cl. 430-333.000.
Tracy, David J.; Login, Robert B.; and Hashem, Mohamed M., 4,698,412, Cl. 528-323.000.

Gale, Allan R.; and Gritter, David J., to Eaton Corporation. Motor electrical positioning system and the application thereof within vehicle traction drives. 4,698,562, Cl. 318-254.000.

Gale, Robert M.; and Berggren, Randall, to ALZA Corporation. Medical device for pulsatile transdermal delivery of biologically active agents. 4,698,062, Cl. 604-896.000.

Gallagher, Nicholas D.; Sternasty, Richard S.; and James, Richard A., to Kimberly-Clark Corporation. Releasable adhesive sheet material bonded product. 4,698,248, Cl. 428-41.000.

Gallas, James M. Optical lens system incorporating melanin as an absorbing pigment for protection against electromagnetic radiation. 4,698,374, Cl. 523-106.000.

Gallay S.A.: *See*—
Le Bret, Lucien F.; and Saada, Robert, 4,697,972, Cl. 413-6.000.

Galloway, Michael D.; Rose, William H.; and Shaffer, David T., to AMP Incorporated. Electrical connector assembly for antiskid braking system. 4,697,863, Cl. 439-544.000.

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Gamblin, Rodger L., to Burlington Industries, Inc. Non-artifically perturbed (NAP) liquid jet printing. 4,698,642, Cl. 346-75.000.

Gamm, Robert J., to Kangaroos U.S.A., Inc. Athletic shoe pocket. 4,697,363, Cl. 36-136.000.

Gansloser, Helmut; and Nissenbaum, Benjamin, to Nissenbaum, Benjamin. Method of producing an algae growth-repellent underwater coating and the resultant product. 4,698,098, Cl. 106-18.360.

Ganter, Max: *See*—
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Ganter, Paul; and Ganter, Max. Base for an article of footwear. 4,697,361, Cl. 36-28.000.

Gantzhorn, John E., Jr.; McCloud, John W., II; and Uhler, Robert O., to Du Pont de Nemours, E. I., and Company. High speed thermomagnetic tape duplication. 4,698,701, Cl. 360-16.000.

Garcia, Edgard, to Etablissement Oksman S. A. R. L. Process and apparatus for generating a tomographic image of a three dimensional object. 4,698,671, Cl. 358-111.000.

Gardner, William E.: *See*—
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Garganese, Richard S. Jewelry display device. 4,697,705, Cl. 206-488.000.

Garrett Corporation, The: *See*—
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Garrison, Gail W. Floor cleaning device. 4,697,295, Cl. 15-227.000.

Gates Energy Products: *See*—
Mullersman, Ferdinand H.; and McClelland, Mark E., 4,698,578, Cl. 320-13.000.

Gaucher, Michel M., to Electronique Serge Dassault. Device for cutting a strip of paper or similar material along preestablished transverse lines of weakness. 4,697,726, Cl. 225-100.000.

Gay, Christian; and Lassiaz, Philippe, to Valeo. Pull-type clutch release bearing assembly. 4,697,681, Cl. 192-98.000.

Gaydarov, Emanuil S.; Russev, Koytcho Y.; Paltchin, Vassil A.; and Stoilov, Ivan T., to Avtokombinat. Trolleybus current collector system enabling common line passing. 4,698,462, Cl. 191-59.100.
Gazale, William J. Combined chisel-guide surgical instrument. 4,697,586, Cl. 128-92.00V.
Gearhart Industries, Inc.: *See*—
Knight, Orien M., 4,697,638, Cl. 166-65.100.
Geiger, John A., to Majestic Industries, Inc. Binder for sheet material. 4,697,945, Cl. 402-75.000.
Geldwerth, Simon, to Do-All Jewelry Mfg. Co., Inc. Reinforced jewelry clasp. 4,697,315, Cl. 24-616.000.
General Clutch Corporation: *See*—
Rude, Edward T., 4,697,630, Cl. 160-177.000.
General Company Limited: *See*—
Ueyama, Seiji, 4,698,268, Cl. 428-484.000.
General Dynamics, Pomona Division: *See*—
Branigan, John T.; and Malaise, Jacques J., 4,698,638, Cl. 343-725.000.
General Electric Company: *See*—
Bayer, Eric W., 4,698,277, Cl. 428-141.000.
Chun, Myung K., 4,698,816, Cl. 372-19.000.
Cooper, Charles E.; and Vest, Glenn E., 4,698,761, Cl. 364-424.000.
Glover, Gary H.; and Pelc, Norbert J., 4,698,591, Cl. 324-307.000.
Hammer, Edward E.; and Lemmers, Eugene, 4,698,549, Cl. 313-490.000.
Hibbert, David A.; and Newmark, Larry J., 4,698,727, Cl. 361-356.000.
Hickin, Charles W. R.; and Tye, Gene, 4,698,489, Cl. 235-407.000.
Howell, Edward K., 4,698,607, Cl. 335-195.000.
Kindig, Alan L.; and Tew, Ho H., 4,698,533, Cl. 310-71.000.
Levin, Sherman L., 4,698,687, Cl. 358-230.000.
Linz, David G.; Grier, Robert K., Jr.; Wetzel, Jennifer A.; and Dada, Abdul G., 4,698,214, Cl. 423-260.000.
O'Connor, Robert G., 4,698,029, Cl. 439-532.000.
Ohno, John M., 4,698,070, Cl. 51-307.000.
Pajerski, Michael J.; Gray, Steven J.; Flakas, Gerald K.; and Cotic, Dennis J., 4,697,661, Cl. 180-6.500.
Seymour, Robert A.; Ritter, Allen M.; Kellogg, Richard A.; and D'Atre, John D., 4,698,577, Cl. 318-805.000.
Vermilyea, Mark E., 4,698,611, Cl. 335-298.000.
General Electric Company, p.l.c., The: *See*—
Jones, Keith L., 4,698,531, Cl. 307-592.000.
General Food Corporation: *See*—
Barnett, Ronald E.; Zanno, Paul R.; and Roy, Glenn M., 4,698,231, Cl. 426-548.000.
General Hospital Corporation, The: *See*—
Neer, Robert M.; Potts, John T., Jr.; and Slovik, David M., 4,698,328, Cl. 514-12.000.
General Motors Corporation: *See*—
Alcini, William V.; and Avery, Steven L., 4,698,473, Cl. 219-10.790.
Fischer, Kurt F., 4,697,839, Cl. 294-115.000.
Georg Fischer Aktiengesellschaft: *See*—
Thalmann, Alfred, 4,697,831, Cl. 285-174.000.
George, Harvey F.; and Oppenheimer, Robert H., to Gravure Association of America. Method and apparatus for transferring ink in gravure printing. 4,697,514, Cl. 101-170.000.
George, William A.: *See*—
Grossman, Mark W.; George, William A.; and Maya, Jakob, 4,698,547, Cl. 313-485.000.
Georgia Tech Research Corporation: *See*—
Matteson, Michael J., 4,697,451, Cl. 73-64.400.
Myerson, Allan S.; and Ernst, William R., 4,698,321, Cl. 502-25.000.
Gerbe, Jean-Pierre, to Thomson CSF. Airborne system for display of collimated images. 4,697,879, Cl. 350-174.000.
Gerber, Walter, to Ferag AG. Apparatus for storing printed products arriving in an imbricated formation. 4,697,400, Cl. 53-118.000.
Gerd Schulz Fahrzeug- und Container- Technik: *See*—
Schulz, Gerd; and Hartleif, Hans-Peter, 4,697,967, Cl. 410-82.000.
Gerhartz, Seigmar: *See*—
Schippers, Heinz; Gerhartz, Seigmar; and Kalthoff, Rolf, 4,697,753, Cl. 242-18.100.
Gerk, Wilfried: *See*—
Klee, Gerhard; Gerk, Wilfried; and Jeschke, Norbert, 4,697,484, Cl. 82-1.500.
Gerlach, Richard K., to Truvel Corporation. High resolution photographic film printer. 4,698,647, Cl. 346-108.000.
Germann, Albrecht J., to De la Rue Giori S.A. Rotary multicolor printing machine for simultaneous recto-verso printing. 4,697,515, Cl. 101-179.000.
Gershon, Eugen; and Sterner, Rudolph J., to Advanced Micro Devices, Inc. Servo data demodulator. 4,698,523, Cl. 307-351.000.
Gerster, John F., to Riker Laboratories, Inc. 1H-imidazo[4,5-c]quinolines and their use as bronchodilating agents. 4,698,348, Cl. 514-293.000.
Gesellschaft fur Strahlen-und Umweltforschung m.b.H.: *See*—
Brand, Hans-Norbert, 4,698,505, Cl. 250-337.000.
Gibbons, Charles E.; Whillock, Allan A.; Lanham, Robert L.; and Kinsey, Joe L., Jr., to International Paper Company. Novel laminates for paperboard cartons and a process of forming said laminates. 4,698,246, Cl. 428-35.000.
Gibson, Kristie C.: *See*—
Gray, Michael L.; and Gibson, Kristie C., 4,698,080, Cl. 62-21.000.
Giglia, Robert D.; and Clasen, Richard H., to American Cyanamid Company. Articles coated with adherent diamondlike carbon films. 4,698,256, Cl. 428-216.000.
Giles, William L., to Ruan, Incorporated. Means and method for reducing the operative height of the fifth wheel of a truck tractor. 4,697,844, Cl. 296-203.000.
Gilliam, Frank D.: *See*—
Durkee, Darryl L.; Manning, Frank E.; and Gilliam, Frank D., 4,697,601, Cl. 128-777.000.
Gillot, Jacques, to Ceraver, S.A. Filter membrane and method of manufacturing it. 4,698,157, Cl. 210-496.000.
Gilson, Richard D., to Foggles, Inc. Visual occulsion apparatus for pilot training. 4,698,022, Cl. 434-36.000.
Gimzewski, James K.: *See*—
Bednorz, Johannes G.; Gimzewski, James K.; and Reihl, Bruno, 4,698,502, Cl. 250-306.000.
Girardin, Roger, to Charmilles Technologies S.A. Method and apparatus for rethreading the electrode wire of a travelling wire EDM apparatus through the cut in a workpiece. 4,698,478, Cl. 219-69.00W.
Glaenzer Spicer: *See*—
Poulin, Bernard, 4,698,046, Cl. 464-115.000.
Glaser, Eberhard: *See*—
Nussbaumer, Manfred; Glaser, Eberhard; Beitinger, Eberhard; and Eckardt, Hartmann, 4,697,953, Cl. 405-128.000.
Gloning, Gunter: *See*—
Brinkhoff, Helmut; Gloning, Gunter; and Steinkotter, Heinz-Gunter, 4,697,299, Cl. 15-323.000.
Glover, Gary H.; and Pelc, Norbert J., to General Electric Company. Method for magnetic field gradient eddy current compensation. 4,698,591, Cl. 324-307.000.
Glyco Inc.: *See*—
Theyson, Thomas W., 4,698,165, Cl. 210-755.000.
Godbersen, Byron L. Boat trailer. 4,697,976, Cl. 414-559.000.
Godecke Aktiengesellschaft: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, 4,698,341, Cl. 514-230.000.
Goehle, Rolf; Schmitt, Volker; Bruckner, Werner; and Greefe, Klaus, to Brown, Boveri & CIE AG. Magnetic tripping device. 4,698,609, Cl. 335-255.000.
Goel, Anil B.; and Richards, Harvey J., to Ashland Oil, Inc. Sag resistant two-component urethane adhesives with improved thermal stability. 4,698,408, Cl. 528-48.000.
Goel, Anil B., to Ashland Oil, Inc. Reaction products of alkanol amines with bicyclic amide acetals and their application in polyurethane polymers. 4,698,409, Cl. 528-73.000.
Goel, Anil B.; and Richards, Harvey J., to Ashland Oil, Inc. Reaction of bicyclic amide acetal with sulfur. 4,698,416, Cl. 528-389.000.
Goetz, George W.; and Hamilton, Brian K., to TRW Automotive Products, Inc. Gas generating material. 4,698,107, Cl. 149-7.000.
Goke, Louis R.; and Grimes, Gary J., to American Telephone and Telegraph Company and AT&T Information Systems Inc. Combined circuit and packet switching system. 4,698,802, Cl. 370-60.000.
Gold, Henning. Combination pneumatic spring and shock absorbing apparatus. 4,697,797, Cl. 267-64.240.
Golden Valley Microwave Foods Inc.: *See*—
Cox, David H.; and Andreas, David W., 4,698,472, Cl. 219-10.55E.
Goldin, Morris, to Hughes Helicopters, Inc. Method and apparatus for handling beltless ammunition in a twin-barreled gun. 4,697,496, Cl. 89-33.030.
Goldman, Alice: *See*—
Roos, Andre; Dutertre-Laduree, Daniel; Goldman, Max; and Goldman, Alice, 4,698,586, Cl. 324-71.100.
Goldman, Max: *See*—
Roos, Andre; Dutertre-Laduree, Daniel; Goldman, Max; and Goldman, Alice, 4,698,586, Cl. 324-71.100.
Goldstein, Alan J.; and Nusser, Terry R., to American Telephone and Telegraph Company AT&T Bell Laboratories. Data base locking. 4,698,752, Cl. 364-200.000.
Goldstein, Arthur, to Ramtek Corporation. Multiprocessor communication method and apparatus. 4,698,746, Cl. 364-200.000.
Goll, John D., to Celotex Corporation, The. Wet-end molded product. 4,698,257, Cl. 428-227.000.
Goller, Elmar: *See*—
Grethe, Klaus; Eickhoff, Heinrich; Goller, Elmar; and Hulsen, Ralf, 4,698,014, Cl. 431-9.000.
Gonzalez, Avelino J.; Murphy, Franklin J.; Emery, Franklin T.; Weyant, Perry A.; and Craig, William G., to Westinghouse Electric Corp. Generator stator winding diagnostic system. 4,698,756, Cl. 364-557.000.
Gopinath, Bhaskarpillai: *See*—
Flores, Christopher; and Gopinath, Bhaskarpillai, 4,698,804, Cl. 370-86.000.
Gordon, Lucas S.: *See*—
Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., 4,698,207, Cl. 422-46.000.
Gordon, Stephen S.: *See*—
Babcock, Stephen G.; Dyer, Gerald E.; and Gordon, Stephen S., 4,698,484, Cl. 219-130.010.
Gors, Heinrich C.: *See*—
Jansons, Viktors; Gors, Heinrich C.; Moore, Stephen; Reamey, Robert H.; and Becker, Paul, 4,698,393, Cl. 525-242.000.
Goto, Hiroshi: *See*—
Hideshima, Osamu; and Goto, Hiroshi, 4,698,127, Cl. 156-643.000.
Goto, Masao; Kimura, Haruo; Okada, Toshihiko; Yuasa, Katsunori; and Ito, Tetuzo, to Oki Electric Industry Co., Ltd. Automatic bank note depositing and dispensing machine. 4,697,708, Cl. 209-534.000.

Goto, Teruo; Takata, Yoshirou; Muraji, Kenji; and Higashi, Mikio, to Daihatsu Diesel Mfg. Co., Ltd. Brake apparatus for automatic door. 4,698,622, Cl. 340-648.000.
Gottschalk, Karl-Heinz, to Babcock Textilmaschinen GmbH. Drier for moving sheet material. 4,697,354, Cl. 34-23.000.
Gottschlich, Rudolf: *See*—
Hausberg, Hans-Heinrich; Bottch, Henning; Gottschlich, Rudolf; Seyfried, Christoph; and Minck, Klaus-Otto, 4,698,351, Cl. 514-338.000.
Gottwald, Johannes F.; and Gruber, Dennis W., to Xerox Corporation. Ribbon deck motor control. 4,698,567, Cl. 318-480.000.
Goudswaard, Frederik, to 501 Stichting Internationaal Instituut Voor Lucht. Apparatus for deriving three-dimensional quantitative information from at least one stereopair. 4,697,347, Cl. 33-1.00A.
Gould Inc.: *See*—
Joy, Richard C.; and Batra, Tarsaim L., 4,697,332, Cl. 437-29.000.
Young, Peter L.; and Chen, Chiu-Chao, 4,698,662, Cl. 357-80.000.
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, to Rhone-Poulenc Specialties Chimiques. Neodymium hydroxy/ammonium nitrate. 4,698,175, Cl. 252-182.000.
Gradecki, Raymond J.; McLaughlin, James M.; and Sorensen, Gerald R., to NCM International, Inc. Carpet display stand. 4,697,710, Cl. 211-45.000.
Graf, Fritz; and Hupfer, Leopold, to BASF Aktiengesellschaft. Preparation of hydroxymethylimidazoles. 4,698,434, Cl. 548-342.000.
Graham, Douglas A. Collapsible foldaway dinghy. 4,697,540, Cl. 114-354.000.
Graham, William M.; Vaughn, Wade C.; and Inman, Charles M., to CooperVision, Inc. Method and apparatus for packaging an intraocular lens. 4,697,697, Cl. 206-5.100.
Granieri, Luigi. Multistoried aseismic building made of modular panels. 4,697,398, Cl. 52-236.800.
Grant, William F.; Burt, Gary W.; and Kumnick, Albert J., to Avco Corporation. Filamentary structural module for composites. 4,697,324, Cl. 29-419.00R.
Grapha-Holding AG: *See*—
Muller, Hans, 4,697,971, Cl. 412-33.000.
Grass Valley Group, Inc., The: *See*—
Lake, David E., Jr.; and Miller, Robert L., 4,698,666, Cl. 358-22.000.
Graton, Michel; and Carmillet, Roger F., to Valeo. Clutch friction disk. 4,697,683, Cl. 192-107.00C.
Graton, Michel: *See*—
Alas, Jacques; and Graton, Michel, 4,697,682, Cl. 192-106.200.
Graubremse GmbH: *See*—
Blanz, Rolanz, 4,697,822, Cl. 280-6.00H.
Graul, Otto; and Oppelt, Herbert, to MWB Messwandler-Bau Aktiengesellschaft. Coil winding machine. 4,697,752, Cl. 242-7.110.
Graves, Alan F.; and Littlewood, Paul A., to Northern Telecom Limited. Frame alignment of tributaries of a t.d.m. bit stream. 4,698,806, Cl. 370-100.000.
Gravure Association of America: *See*—
George, Harvey F.; and Oppenheimer, Robert H., 4,697,514, Cl. 101-170.000.
Gray, George W.; and Nicholas, Beatrice M., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Heterocyclically substituted ethanes and their use in liquid crystal materials and devices. 4,698,176, Cl. 252-299.610.
Gray, Michael L.; and Gibson, Kristie C., to Phillips Petroleum Company. Feed control for cryogenic gas plant. 4,698,080, Cl. 62-21.000.
Gray, Steven J.: *See*—
Pajerski, Michael J.; Gray, Steven J.; Flakas, Gerald K.; and Cotic, Dennis J., 4,697,661, Cl. 180-6.500.
Grebur, Dennis J.: *See*—
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,398, Cl. 525-437.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,399, Cl. 525-449.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,400, Cl. 525-450.000.
Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., 4,698,402, Cl. 525-533.000.
Greefe, Klaus: *See*—
Goehle, Rolf; Schmitt, Volker; Bruckner, Werner; and Greefe, Klaus, 4,698,609, Cl. 335-255.000.
Green, Elisabeth, administrator: *See*—
Green, Marshall S., deceased; and Boisvert, Jean-Paul, 4,698,134, Cl. 162-199.000.
Green, James A., II: *See*—
Young, Donald C.; and Green, James A., II, 4,698,443, Cl. 564-38.000.
Green, Marshall S., deceased (by Green, Elisabeth, administrator); and Boisvert, Jean-Paul, to Consolidated-Bathurst, Inc. Method for cleaning papermaking fabrics. 4,698,134, Cl. 162-199.000.
Greenfeld, Albert R.; Reis, Herbert; and Tittmann, Bernhard R., to Greenfeld, Albert R. Ultrasonic self-cleaning catheter system for indwelling drains and medication supply. 4,698,058, Cl. 604-266.000.
Gressel AG: *See*—
Wuerthele, Adolf, 4,697,801, Cl. 269-100.000.
Grethe, Klaus; Eickhoff, Heinrich; Goller, Elmar; and Hulsen, Ralf, to L. & C. Steinmuller GmbH; and Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V. Method and apparatus for the low-wear atomization of liquid highly viscous and/or suspended fuel intended for combustion or gasification in burner flames. 4,698,014, Cl. 431-9.000.
Grier, Robert K., Jr.: *See*—
Linz, David G.; Grier, Robert K., Jr.; Wetzel, Jennifer A.; and Dada, Abdul G., 4,698,214, Cl. 423-260.000.
Griffin, Alan R., to Thin-Lite Corporation. Clip on stand off wireway cover. 4,698,733, Cl. 362-222.000.
Griffiths, Stephen F.: *See*—
Stevens, Raymond R., Jr.; Beisel, Robert R.; and Griffiths, Stephen F., 4,697,448, Cl. 72-405.000.
Grimes, Gary J.: *See*—
Goke, Louis R.; and Grimes, Gary J., 4,698,802, Cl. 370-60.000.
Grinda, Francoise; and Gueyne, Jean, to SAPHYR S.A.R.L. Extraction of insecticides from plants. 4,698,222, Cl. 421-195.000.
Grippi, Nicholas A., to Becton, Dickinson and Company. R :bber/plastic stopper composite with mechanical adhesive joints. 4,697,717, Cl. 215-354.000.
Gritter, David J.: *See*—
Gale, Allan R.; and Gritter, David J., 4,698,562, Cl. 318-254.000.
Grohn, Michael: *See*—
Conrad, Ulrich; Grohn, Michael; and Moser, Peter, 4,697,423, Cl. 60-605.000.
Groman, Ernest V.: *See*—
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,698,302, Cl. 435-94.000.
Groschupp, Karl-Heinz; and Vreeke, Simon P., to Kabelwerke Friedrich C. Ehlers. Drawn mine-removing apparatus. 4,697,522, Cl. 102-402.000.
Grossa, Mario, to Du Pont de Nemours, E. I., and Company. Process for forming positive tonable images using a photosensitive material containing at least 1,4-dihydropyridine. 4,698,293, Cl. 430-291.000.
Grossman, Mark W.; George, William A.; and Maya, Jakob, to GTE Products Corporation. Low pressure arc discharge lamp apparatus with magnetic field generating means. 4,698,547, Cl. 313-485.000.
Grotkasten, Klaus, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Pneumatic-tire heating and vulcanizing press. 4,698,002, Cl. 425-28.00R.
Grubbs, Jack M.: *See*—
Dively, Lee V.; and Grubbs, Jack M., 4,698,840, Cl. 379-112.000.
Gruber, Dennis W.: *See*—
Gottwald, Johannes F.; and Gruber, Dennis W., 4,698,567, Cl. 318-480.000.
Gruen, Dieter M., to United States of America, Energy. Unified first wall-blanket structure for plasma device applications. 4,698,198, Cl. 376-146.000.
Gruia, Adrian J., to UOP Inc. Hydrocracking and recovering polynuclear aromatic compounds in slop wax stream. 4,698,146, Cl. 208-86.000.
Grumman Aerospace Corporation: *See*—
Clarius, George A., 4,698,603, Cl. 332-31.00R.
Klein, Robert W., 4,697,768, Cl. 244-191.000.
Grund, Karl. Basemented floor structure for a waste dump. 4,697,954, Cl. 405-128.000.
Grunzweig & Hartmann und Glasfaser AG: *See*—
Bengl, Dieter; and Horres, Johannes, 4,698,085, Cl. 65-16.000.
Fachat, Gaston; Sistermann, Klaus; and Ungerer, Heinz-Jurgen, 4,698,086, Cl. 65-16.000.
Gruppo Lepetit, S.p.A.: *See*—
Malabarba, Adriano; and Cavalleri, Bruno, 4,698,418, Cl. 530-317.000.
GTE Communication Systems Corporation: *See*—
Bhadriraju, Nataraj, 4,698,749, Cl. 364-200.000.
Mills, Jeffrey P.; and Macrander, Max S., 4,698,771, Cl. 364-768.000.
GTE Laboratories Incorporated: *See*—
Amstutz, Stanford R.; Eliscu, Mark; and Haselton, E. Fletcher, 4,698,799, Cl. 370-58.000.
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary; and Sarin, Vinod K., 4,698,266, Cl. 428-457.000.
Haselton, E. Fletcher; Amstutz, Stanford R.; and Lenart, Joseph M., 4,698,803, Cl. 370-60.000.
Haselton, E. Fletcher; and Amstutz, Stanford R., 4,698,841, Cl. 379-269.000.
Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., 4,698,121, Cl. 156-622.000.
Tzou, Kou-Hu, 4,698,689, Cl. 358-260.000.
GTE Products Corporation: *See*—
Bouchard, Andre C.; and Thibault, Paul A., 4,698,040, Cl. 445-26.000.
Chenot, Charles F.; and Taylor, Robert E., 4,698,548, Cl. 313-487.000.
Flaherty, John M., 4,698,239, Cl. 427-67.000.
Grossman, Mark W.; George, William A.; and Maya, Jakob, 4,698,547, Cl. 313-485.000.
Ornstein, Jacob J., 4,698,270, Cl. 428-617.000.
GTE Sprint Communications Corp: *See*—
Evans, Wallace; and Redman, Gary M., 4,698,641, Cl. 343-882.000.
Redman, Gary M., 4,698,640, Cl. 343-882.000.
GTE Telecommunicazioni S.p.A.: *See*—
Merli, Gabriele; and Testi, Termano, 4,698,597, Cl. 328-163.000.
Guardian Interlock Systems, Inc.: *See*—
Collier, Donald W.; and Fuller, Kip L., 4,697,666, Cl. 180-272.000.
Guerin, Bernard: *See*—
Forterre, Gerard; and Guerin, Bernard, 4,698,604, Cl. 333-24.200.
Gueyne, Jean: *See*—
Grinda, Francoise; and Gueyne, Jean, 4,698,222, Cl. 421-195.000.

Gugel, Siegfried; Pellkofer, Dieter; and Forner, Siegfried, to Kraftwerk Union Aktiengesellschaft. Welding tongs for connecting two abutting pipe ends by arc welding. 4,698,474, Cl. 219-60.00A.

Guha, Subhendu: *See—*
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi C.; Fournier, Jeffrey; and Kulman, James, 4,698,234, Cl. 427-39.000.

Guichard, Francoise: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Pontagnier, Henri; and Prat, Gisele, 4,698,343, Cl. 514-255.000.

Guilbault, Lawrence J.; and Ulman, Jeffrey A., to Morton Thiokol, Inc. Method for prevention of metallic precipitate reoxidation/redissolution in aqueous systems. 4,698,162, Cl. 210-710.000.

Guilford Mills, Inc.: *See—*
Duval, Paul A., 4,698,276, Cl. 428-116.000.

Guislain, Guy. Articulation device for use in raising and supporting an antenna mast. 4,697,779, Cl. 248-530.000.

Gulgielmo, Richard J., Sr., to EMA Company. Net antifouling composition. 4,698,097, Cl. 106-15.050.

Gum Base Co., S.p.A.: *See—*
Perfetti, Giorgio; and Sozzi, Giuseppe, 4,698,223, Cl. 426-4.000.

Gunnerson, Robert E., to Sunsweet Growers, Inc. Method for compressing pitted prunes. 4,698,229, Cl. 426-512.000.

Gunter, William D., Jr.; Donaldson, Ralph W.; and Anderson, Alma G., Jr., to United States of America, National Aeronautics and Space Administration. Dual mode laser velocimeter. 4,697,922, Cl. 356-28.500.

Gustafsson, Erik: *See—*
Kero, Ernst; and Gustafsson, Erik, 4,697,529, Cl. 108-511.000.

Guthrie, David W. Apple labeling process. 4,698,226, Cl. 426-248.000.

Gutmann, Franz, to Plaston AG. Evaporation air humidifier. 4,698,188, Cl. 261-107.000.

Guyot, Morel D. Dendrite generator. 4,697,545, Cl. 118-624.000.

Haagexport, B.V.: *See—*
Freyer, Hendrik, 4,697,312, Cl. 24-30.50S.

Haake, Werner. Safety device for garage doors and the like. 4,697,676, Cl. 192-8.00R.

Haberer, Johann: *See—*
Bauer, Karlheinz; Haberer, Johann; and Arzberger, Maximilian M., 4,697,947, Cl. 403-14.000.

Hacking, Colin A.: *See—*
Kelly, Joseph L., Jr.; Howard, Mig A.; Nysen, Paul A.; and Hacking, Colin A., 4,698,631, Cl. 340-853.000.

Hafele KG: *See—*
Holzle, Roland, 4,697,934, Cl. 384-19.000.

Haga, Masakazu: *See—*
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.

Hagimoto, Yoshio: *See—*
Ida, Jinsei; Hagimoto, Yoshio; and Ishikawa, Makoto, 4,697,965, Cl. 408-56.000.

Hagiuda, Nobuyoshi: *See—*
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Hagiwara, Isao, to Yoshida Kogyo K. K. Controlling device for an automatic door. 4,697,383, Cl. 49-25.000.

Hahn, Alfred: *See—*
Brendl, Rudolf; Hahn, Alfred; and Weiss, Karl, 4,697,802, Cl. 269-323.000.

Hahn, Roger A.; and Heins, Henry H., to Adolph Coors Company. Apparatus and method for handling folded cartons. 4,697,973, Cl. 414-330.000.

Haigh, David G.; and Singh, Bhajan, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Switched capacitor switching. 4,698,596, Cl. 328-127.000.

Hair, Jakie A. Apparatus for sustained dispensation of a chemical agent. 4,697,549, Cl. 119-156.000.

Haken, Boger A.: *See—*
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Halcon SD Group, Inc., The: *See—*
Hewlett, Colin, 4,698,187, Cl. 260-546.000.

Halkola, Kyle G.: *See—*
Tustaniwskyj, Jerry I.; and Halkola, Kyle G., 4,698,728, Cl. 361-385.000.

Hall, Shelby J.; Olekna, David J.; and Davies, Donald M., Jr., to Ortho Diagnostic Systems Inc. Particle washing and separation method. 4,698,311, Cl. 436-10.000.

Hall, Shirl F. Recreational watercraft. 4,698,033, Cl. 440-27.000.

Halliburton Company: *See—*
Handke, Wayne A.; and Priest, Mark A., 4,698,510, Cl. 250-506.100.
Scala, Carl, 4,698,500, Cl. 250-256.000.
Smith, Harry D., Jr., 4,698,499, Cl. 250-256.000.
Szarka, David D., 4,697,640, Cl. 166-120.000.
White, Bill W., 4,697,641, Cl. 166-243.000.
Wienck, Dennis A., 4,697,613, Cl. 137-171.000.

Halomet Inc.: *See—*
Aldrich, Robert G.; Earl, Geoffrey H.; and Trunko, David W., 4,698,289, Cl. 430-106.600.

Halton Oy: *See—*
Aalto, Erkki; and Yla-Hemmila, Veikko, 4,697,607, Cl. 137-1.000.

Hamacher, Martin. Electrical device for use in an explosive environment. 4,698,456, Cl. 174-11.00R.

Hamada, Eiichi: *See—*
Watanabe, Hiroyuki; Hamada, Eiichi; Hayashi, Motomu; and Ono, Kenji, 4,697,386, Cl. 49-374.000.

Hamada, Tetsuro: *See—*
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,697,816, Cl. 280-91.000.

Hamamatsu Photonics Kabushiki Kaisha: *See—*
Kinoshita, Katsuyuki; and Suzuki, Yoshiji, 4,698,544, Cl. 313-379.000.
Kobayashi, Masayasu; and Eno, Julius R., Jr., 4,698,550, Cl. 313-618.000.

Hamamoto, Takashi: *See—*
Ozawa, Kunitaka; Haruta, Masahiro; Eida, Tsuyoshi; and Hamamoto, Takashi, 4,698,151, Cl. 210-96.100.

Hamano, Hideo; Takeshita, Keiji; and Funato, Yasumichi, to Toyota Jidosha Kabushiki Kaisha. Dynamic damper. 4,697,781, Cl. 248-559.000.

Hamilton, Brian K.: *See—*
Goetz, George W.; and Hamilton, Brian K., 4,698,107, Cl. 149-7.000.

Hamilton, Howard D.: *See—*
Dutkanych, Thomas A., 4,697,836, Cl. 294-68.200.

Hamilton, Laura M.: *See—*
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Hammann, Ingeborg: *See—*
Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.

Hammer, Edward E.; and Lemmers, Eugene, to General Electric Company. D.C. lamp discharge gas pumping control. 4,698,549, Cl. 313-490.000.

Hammond, James A.: *See—*
Koch, G. Teryl; Smith, Thomas L.; Jacklin, Keith A.; and Hammond, James A., 4,698,252, Cl. 428-159.000.

Hammond, Michael: *See—*
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.

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Hanazono, Masanobu: *See—*
Komuro, Matahiro; Kozono, Yuzo; Yasuda, Takeshi; Narishige, Shinji; Hanazono, Masanobu; and Kuroda, Tetsuro, 4,698,273, Cl. 428-635.000.

Handke, Wayne A.; and Priest, Mark A., to Halliburton Company. Multiple reservoir transportation assembly for radioactive substances, and related method. 4,698,510, Cl. 250-506.100.

Handschuch, Karl; and Bock, Erich, to Schubert & Salzer. Open-end spinning device. 4,697,409, Cl. 57-401.000.

Hanna, John E.: *See—*
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Hansen, Charles N. Deicing compositions. 4,698,173, Cl. 252-70.000.

Hansen, Gerald D., to Pony Industries, Inc. Polymer blend for dispersion of particulate materials in aqueous systems. 4,698,161, Cl. 210-701.000.

Hanson, Gary R., to Minnesota Mining and Manufacturing Company. Cover for binding sheets. 4,697,970, Cl. 412-4.000.

Hanson, Gustaf H. Orthodontic brackets. 4,698,017, Cl. 433-11.000.

Hansson, Goran. Method of treating wood. 4,698,305, Cl. 435-171.000.

Hara, Hajime: *See—*
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Hara, Kunihiko: *See—*
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Hara, Ryuichi: *See—*
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Harada, Mitsuaki: *See—*
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Harada, Naoki: *See—*
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Harada, Nozomu: *See—*
Endo, Yukio; Harada, Nozomu; and Yoshida, Okio, 4,698,686, Cl. 358-213.180.

Harada, Shigeki: *See—*
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Harada, Yoshiharu: *See—*
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Harada, Yoshihito: *See—*
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Haraga, Koichi: *See—*
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Haraguchi, Masato, to Toray Industries, Inc. Method and apparatus for preparing hemodialysis fluids of accurately portioned components. 4,698,160, Cl. 210-647.000.

Harashima, Eiichi, to Kabushiki Kaisha Murakoshi Seiko. Television turntable for providing improved stability. 4,697,778, Cl. 248-349.000.

Harder, Hans E.: *See*—
Richter, Karl M.; and Harder, Hans E., 4,698,579, Cl. 320-14.000.
Hardtle, Sylvia: *See*—
Schmidberger, Rainer; and Hardtle, Sylvia, 4,698,096, Cl. 75-248.000.
Hardy, Richard; Neumann, Frank D.; and Ruzicka, Dennis E., to Boeing Company, The. Aircraft autonomous reconfigurable internal weapons bay for loading, carrying and launching different weapons therefrom. 4,697,764, Cl. 244-137.400.
Hargoaa, Francis: *See*—
Denhez, Alain; Hargoaa, Francis; and Aubree, Jean, 4,698,826, Cl. 375-3.000.
Harkins, Joseph C., Jr. Surface covering product and process therefor. 4,698,258, Cl. 428-285.000.
Harlos, Hartmut, to U. S. Philips Corporation. Circuit arrangement for the control of a picture tube. 4,698,557, Cl. 315-383.000.
Harness, Ronald L.: *See*—
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Harper, Donald J.: *See*—
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Harris Corporation: *See*—
Blankenship, Timothy L.; and Nolan, Joseph G., III, 4,698,589, Cl. 324-158.00R.
Harris, James E.: *See*—
Robeson, Lloyd M.; Harris, James E.; Kawakami, James H.; and Maresca, Louis M., 4,698,390, Cl. 525-133.000.
Harsch, Erich; and Reichenbach, Reiner, to Maschinenfabrik Muller-Weingarten AG. Shiftable workpiece gripper for a multi-stage press. 4,697,449, Cl. 72-405.000.
Hart, Richard T.: *See*—
Kastendieck, William A.; Hart, Richard T.; and Isbell, Wayne, 4,697,783, Cl. 248-900.000.
Hart, Terance W., to May & Baker Limited. Prostacyclin analogues. 4,698,363, Cl. 514-530.000.
Hartenstein, Johannes: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, 4,698,341, Cl. 514-230.000.
Hartleif, Hans-Peter: *See*—
Schulz, Gerd; and Hartleif, Hans-Peter, 4,697,967, Cl. 410-82.000.
Hartman, John F. Robot gripping jaw operator. 4,697,838, Cl. 294-88.000.
Hartmann, Heinrich: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Hettche, Albert; Schneider, Rolf; and Raubenheimer, Hans-Juergen, 4,698,174, Cl. 252-174.240.
Haruta, Masahiro: *See*—
Ozawa, Kunitaka; Haruta, Masahiro; Eida, Tsuyoshi; and Hamamoto, Takashi, 4,698,151, Cl. 210-96.100.
Haruta, Masatake; Sano, Hiroshi; and Kobayashi, Tetsuhiko, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Method for manufacture of catalyst composite having gold or mixture of gold with catalytic metal oxide deposited on carrier. 4,698,324, Cl. 502-243.000.
Harz, Debra L.: *See*—
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Haselton, E. Fletcher; Amstutz, Stanford R.; and Lenart, Joseph M., to GTE Laboratories Incorporated. Burst-switching communications system. 4,698,803, Cl. 370-60.000.
Haselton, E. Fletcher; and Amstutz, Stanford R., to GTE Laboratories, Incorporated. Methods of establishing and terminating connections in a distributed-control burst switching communications system. 4,698,841, Cl. 379-269.000.
Haselton, E. Fletcher: *See*—
Amstutz, Stanford R.; Eliscu, Mark; and Haselton, E. Fletcher, 4,698,799, Cl. 370-58.000.
Hashem, Mohamed M.: *See*—
Tracy, David J.; Login, Robert B.; and Hashem, Mohamed M., 4,698,412, Cl. 528-323.000.
Hashima, Akio: *See*—
Tomita, Masao; and Hashima, Akio, 4,698,694, Cl. 358-326.000.
Hashimoto, Kenshiro; and Okada, Yasushi, to Honda Giken Kogyo Kabushiki Kaisha. Device for sensing an oxygen concentration in gaseous body with a source of pump current for an oxygen pump element. 4,698,209, Cl. 422-88.000.
Hashimoto, Masashi: *See*—
Kitaura, Yoshihiko; Oku, Teruo; Hirai, Hideo; Yamamoto, Tosiyuki; and Hashimoto, Masashi, 4,698,349, Cl. 514-306.000.
Hashimoto, Tetsuro: *See*—
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Hasircoglu, Alexander W., to Du Pont de Nemours, E. I., and Company. Insulation displacement coaxial cable termination and method. 4,697,862, Cl. 439-404.000.
Hatabe, Yukio: *See*—
Kimura, Yoshikazu; Sho, Ikuo; and Hatabe, Yukio, 4,698,569, Cl. 318-567.000.
Hatakeyama, Hideharu; and Takahashi, Hidenao, to Sanden Corporation. Piston ring for a piston in a refrigerant compressor. 4,697,992, Cl. 417-269.000.
Hatano, Takashi; Nara, Takashi; Kawato, Yutaka; and Okada, Sumie, to Fujitsu Limited. Digital exchange system. 4,698,801, Cl. 370-58.000.
Hataoka, Seiichi: *See*—
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Hattori, Masafumi: *See*—
Inoue, Takayuki; Hattori, Masafumi; Hayama, Kazuhide; and Maruta, Riichiro, 4,698,395, Cl. 525-327.800.
Hattori, Takemi; and Kawamura, Reiki, to Aisin Seiki Kabushiki Kaisha. Seatback spring device for automobile. 4,697,848, Cl. 297-460.000.
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, to Honda Giken Kogyo, K.K.; and NHK Spring Co., Ltd. Laminated metallic belt for torque transmission device and method of manufacture thereof. 4,698,050, Cl. 474-242.000.
Hauni-Werke Korber & Co. KG: *See*—
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Hausberg, Hans-Heinrich; Bottch, Henning; Gottschlich, Rudolf; Seyfried, Christoph; and Minck, Klaus-Otto, to Merck Patent Gesellschaft mit beschraenkter Haftung. Tetrahydrocarbazole derivatives and pharmaceutical compositions. 4,698,351, Cl. 514-338.000.
Hauser, Oscar G., to Xerox Corporation. Toner containment method and apparatus. 4,697,914, Cl. 355-3.0DD.
Havener, John W.: *See*—
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., 4,697,721, Cl. 221-211.000.
Havens, Marvin R., to W. R. Grace & Co., Cryovac Div. Vinylidene chloride composition and film made therefrom. 4,698,111, Cl. 156-244.110.
Hayakawa, Yoichi; Kawai, Masao; Yoshizawa, Kenichi; Harada, Yoshiharu; and Fukumura, Kagenori, to Aisin-Warner Limited; and Toyota Jidosha Kabushiki Kaisha. Engine throttle opening dependent hydraulic vehicular transmission system. 4,697,479, Cl. 74-867.000.
Hayama, Kazuhide: *See*—
Inoue, Takayuki; Hattori, Masafumi; Hayama, Kazuhide; and Maruta, Riichiro, 4,698,395, Cl. 525-327.800.
Hayama, Mamoru: *See*—
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Hayasaka, Nobuo; Okano, Haruo; and Horiike, Yasuhiro, to Kabushiki Kaisha Toshiba. Pattern-forming method. 4,698,238, Cl. 427-53.100.
Hayashi, Keijiro; Shinya, Kenzo; Saeki, Yasuo; and Asai, Shigeru, to Mizuno Corporation. Ski. 4,697,820, Cl. 280-609.000.
Hayashi, Keijiro; Shinya, Kenzo; Awano, Toshimi; and Asai, Shigeru, to Mizuno Corporation. Ski. 4,697,821, Cl. 280-609.000.
Hayashi, Kimiyoshi; Ohno, Akio; Hirooka, Kazuhiko; and Murayama, Yasushi, to Canon Kabushiki Kaisha. Image forming apparatus with detecting and controlling means. 4,697,915, Cl. 355-14.00D.
Hayashi, Motomu: *See*—
Watanabe, Hiroyuki; Hamada, Eiichi; Hayashi, Motomu; and Ono, Kenji, 4,697,386, Cl. 49-374.000.
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Anti-lock braking system for the front wheel of a motorcycle. 4,697,825, Cl. 280-703.000.
Hayashi, Yoshiharu; and Kouji, Hiroyuki, to Asahi Kasei Kogyo Kabushiki Kaisha. 2-nitro-5-(2'chloro-4'trifluoromethylphenoxy)-phenylacetic esters, herbicidal composition, and method for destruction of undesirable weeds. 4,698,094, Cl. 71-108.000.
Hayashi, Yoshiki: *See*—
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Hayashibara, Ken: *See*—
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Hayes, Earl J.; Cooper, Ralph M.; Denlinger, Keith R.; and Shuey, John R., to AMP Incorporated. Printed circuit board receptacle for sealed connector. 4,697,864, Cl. 439-444.000.
Hayman, Cecil: *See*—
Restall, James E.; and Hayman, Cecil, 4,698,130, Cl. 156-646.000.
Haynes, Darrel W., to Haynes, Darrel W. Device and method for plugging an intramedullary bone canal. 4,697,584, Cl. 128-92.0VQ.
Hedge, Roger W.: *See*—
Brown, Ian C.; Hedge, Roger W.; and Molyneux, David J., 4,697,604, Cl. 131-296.000.
Hedman, Robert L., to International Business Machines Corporation. Differential summing amplifier for inputs having large common mode signals. 4,698,599, Cl. 330-252.000.
Hehl, Karl. Horizontal mold closing unit for an injection molding machine. 4,698,007, Cl. 425-190.000.
Heidelberger Druckmaschinen AG: *See*—
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Heimgartner, Dieter: *See*—
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Heine, Wilhelm: *See*—
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Heins, Henry H.: *See*—
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Heinsohn, George E.: *See*—
Blaisdell, Charles T.; Cordes, Walter J.; Heinsohn, George E.; Kook, John F.; and Kosak, John R., 4,698,438, Cl. 558-3.000.
Heitmann, Arnold M.: *See*—
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Helger, Roland: *See*—
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Helix Technology Corporation: *See*—
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Hellmers, Emil D. Marine pile protective system. 4,697,957, Cl. 405-216.000.

Hellwig, Claus: *See*—
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Henderson, Harold R.; and Mosinski, David, to Arcair Company. Exothermic cutting electrode. 4,697,791, Cl. 266-48.000.

Henderson, James J.; and Newell, Chester W., to Cartrex. Reel for aligning tape path. 4,697,759, Cl. 242-179.000.

Henkel Corporation: *See*—
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Henkel, Eberhard; Dolabdjian, Barkew; Helger, Roland; Klink, Rainer; and Wurzburg, Uwe, to Merck Patent Gesellschaft mit beschrankter Haftung. Process and reagent for the determination of α-amylase. 4,698,300, Cl. 435-18.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Hoeffkes, Horst; and Schrader, Dieter, 4,698,065, Cl. 8-406.000.
Jeromin, Lutz; Peukert, Eberhard; and Wollmann, Gerhard, 4,698,186, Cl. 260-421.000.
Rose, David; Maak, Norbert; and Lieske, Edgar, 4,698,066, Cl. 8-408.000.

Henley Group, Inc., The: *See*—
Patel, Ramanlal L., 4,697,473, Cl. 74-519.000.

Henri, Rene : *See*—
Blanc, Michel; Pollard, Jean; Marchand, Gerard; and Henri, Rene , 4,697,867, Cl. 350-96.100.

Henry Ford Hospital: *See*—
Horowitz, Bruce S., 4,697,575, Cl. 128-1.200.

Hense, Ulrich: *See*—
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Hensen, Helmuth: *See*—
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Her Majesty the Queen in right of Canada, as represented by the Minister of Energy & Natural Resources: *See*—
Kentfield, John A. C.; and MacGregor, Ian, 4,697,988, Cl. 416-237.000.

Herb, Rudolf, to Albert-Frankenthal AG. Folder with rotating guide roller at folding blade and jaw cylinder exit. 4,697,805, Cl. 270-47.000.

Hercules Incorporated: *See*—
Messer, Wayne R., 4,698,286, Cl. 430-17.000.

Herkert, Hans; and Timmermann, Uwe, to Siemens Aktiengesellschaft. Method and apparatus for transmission of data with data reduction. 4,698,628, Cl. 340-825.020.

Herman, John; and Chirico, George, to Perkin-Elmer Corporation, The. Apparatus for identifying the connection position of a wire having two modes of operation. 4,698,585, Cl. 324-66.000.

Hermann, Dietmar: *See*—
Bernitz, Bernhard; Brodmann, Richard; and Hermann, Dietmar, 4,698,193, Cl. 264-171.000.

Hermann Koeniger, Firma: *See*—
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Hernandez, Irene H.: *See*—
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Herrmann, Manfred: *See*—
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Herschlag, Herbert. Portable upholstered furniture. 4,697,847, Cl. 297-440.000.

Hertel, Heinz E., to Bell & Howell Company. Film developing system for microimage recording apparatus. 4,697,919, Cl. 355-27.000.

Hertweck, Gernot; Kappis, Fritz; Kellermann, Guenter; and Schalueck, Klaus, to Daimler-Benz Aktiengesellschaft. Intake system for a multi-cylinder internal combustion engine. 4,697,569, Cl. 123-568.000.

Hervey, Laurence R. B. Use of oxonated poly(alkylene oxides) as surface treatment agents. 4,698,259, Cl. 428-378.000.

Herzog, Peter: *See*—
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Herzog, William F.: *See*—
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Hess, Heinz; and Peth, Horst, to Robert Bosch GmbH. Method to reestablish a predetermined phase relationship of a chrominance TV signal with respect to a reference. 4,698,667, Cl. 358-35.000.

Hettche, Albert: *See*—
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Hewlett, Colin, to Halcon SD Group, Inc., The. Preparation of carboxylic acid anhydrides. 4,698,187, Cl. 260-546.000.

Hewlett-Packard Company: *See*—
Abell, Steven T., 4,698,784, Cl. 364-900.000.

Heynisch, Hinrich; and Huebner, Klemens, to Siemens Aktiengesellschaft. Air-cooled discharge tube for an ion laser. 4,698,818, Cl. 372-34.000.

Heys, George, Jr.; Aleshire, Rex A.; and Sampson, Harold J., to NCR Corporation. Protective cover for housing for data processing mechanism. 4,698,707, Cl. 360-99.000.

Hibbert, David A.; and Newmark, Larry J., to General Electric Company. Compact non-metallic load center enclosure. 4,698,727, Cl. 361-356.000.

Hickey, Charles P. Carrier for trick-or-treating or the like. 4,698,732, Cl. 362-154.000.

Hickin, Charles W. R.; and Tye, Gene, to General Electric Company. Aircraft automatic boresight correction. 4,698,489, Cl. 235-407.000.

Hickner, Richard A.: *See*—
Anderson, Kenneth W.; and Hickner, Richard A., 4,698,141, Cl. 204-181.700.

Hida, Yoshinori; Meguriya, Noriyuki; and Yoshida, Akira, to Shin-Etsu Chemical Co., Ltd. Surface-coated optical fiber. 4,697,877, Cl. 350-96.300.

Hidaka, Chikara: *See*—
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Hideo Fukuda: *See*—
Fukuda, Hideo; Ogawa, Takahira; and Fujii, Takao, 4,698,304, Cl. 435-166.000.

Hideshima, Osamu; and Goto, Hiroshi, to Fujitsu Limited. Process for fabricating a self-aligned bipolar transistor. 4,698,127, Cl. 156-643.000.

Hieber, Thomas E.: *See*—
Danner, Michael E.; and Hieber, Thomas E., 4,698,166, Cl. 210-774.000.

Higa, Osamu, to Kabushiki Kaisha Toshiba. Protection circuit for a power converter apparatus. 4,698,736, Cl. 363-51.000.

Higashi, Mikio: *See*—
Goto, Teruo; Takata, Yoshirou; Muraji, Kenji; and Higashi, Mikio, 4,698,622, Cl. 340-648.000.

Higginbotham, William C., to Westinghouse Electric Corp. Barrier for quartz crucible for drawing silicon dendritic web and method of use. 4,698,120, Cl. 156-608.000.

Higuchi, Kazuo: *See*—
Sasaki, Kiichi; Tabata, Hiroshi; Okuhara, Hisakazu; and Higuchi, Kazuo, 4,697,827, Cl. 280-808.000.

Hijikigawa, Masaya: *See*—
Sannomiya, Hitoshi; and Hijikigawa, Masaya, 4,698,658, Cl. 357-30.000.
Watanabe, Masanori; and Hijikigawa, Masaya, 4,698,657, Cl. 357-25.000.

Hiketa, Manabu, to Mazda Motor Corporation. Automatic transmission apparatus. 4,697,471, Cl. 74-359.000.

Hildebrandt, Eugene F.; and Ottersbach, Thomas V., to Emerson Electric Co. Insulator system for switch terminals. 4,697,860, Cl. 439-374.000.

Hilger, Manfred; and Klein, Norbert, to Hoechst Aktiengesellschaft. Photopolymerizable recording roll material with end caps. 4,698,292, Cl. 430-273.000.

Hill, Christopher R.: *See*—
Weiss, Jacqueline B.; and Hill, Christopher R., 4,698,301, Cl. 435-41.000.

Hill, David A. Control unit for outboard marine motor assembly. 4,698,032, Cl. 440-6.000.

Hill, David T.; and Johnson, Randall K., to SmithKline Beckman Corporation. Triphos and tetraphos gold compounds and ligands. 4,698,422, Cl. 536-17.100.

Hill, H. Wayne, Jr.; and Cliffton, Michael D., to Phillips Petroleum Company. Polyester resins. 4,698,411, Cl. 528-303.000.

Hill, Loren G. Method and apparatus for locating and catching fish. 4,697,371, Cl. 43-4.000.

Hilliard-Lyons Patent Management, Inc.: *See*—
Todd, Lee T., Jr.; and Starkey, Cornelius J., IV, 4,698,684, Cl. 358-237.000.

Hillin, Wilbert L. Multi-lock security device. 4,697,443, Cl. 70-121.000.

Hilmersson, Anders E.; and Ulvros, Istvan M., to Tetra Pak International AB. Method and an arrangement for the detection by photoelectric means of markings made on a travelling material web provided with printed decoration. 4,698,514, Cl. 250-566.000.

Hilton, Richard D.; and Coate, Godfrey T., to United States of America, Navy. Radar guidance system. 4,698,635, Cl. 342-64.000.

Hilvenna Limited: *See*—
Saxby, Michael E., 4,697,523, Cl. 102-440.000.

Hirai, Hideo: *See*—
Kitaura, Yoshihiko; Oku, Teruo; Hirai, Hideo; Yamamoto, Tosiyuki; and Hashimoto, Masashi, 4,698,349, Cl. 514-306.000.

Hiramatsu, Akira: *See*—
Ohtaka, Keiji; Hiramatsu, Akira; Suda, Yasuo; Akashi, Akira; and Ishizaki, Akira, 4,698,492, Cl. 250-201.000.

Hiramitsu, Tetsushi: *See*—
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, 4,698,838, Cl. 379-58.000.

Hiramoto, Takashi: *See*—
Mitani, Tadayuki; Endo, Mamoru; and Hiramoto, Takashi, 4,698,441, Cl. 562-531.000.

Hiramoto, Yukio, to Nissan Motor Co., Ltd. Position and direction of motion sensing system. 4,698,828, Cl. 377-3.000.

Hirano, Atsuo: *See*—
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, 4,698,838, Cl. 379-58.000.

Hirata, Kiichi, to West Tsusho Co., Ltd. Underwater cleaning apparatus. 4,697,536, Cl. 114-222.000.

Hirata, Makizo: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; Tamba, Shinichi; and Fukui, Noboru, 4,697,555, Cl. 123-90.230.
Hirata, Osamu: *See*—
Nishimuro, Yoshiaki; Hirata, Osamu; Kano, Kuniomi; Miyakawa, Akira; Fushimoto, Hideo; and Sekine, Kazumi, 4,698,783, Cl. 364-710.000.
Hirata, Toichi: *See*—
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.
Hiratsuka, Kosai: *See*—
Muroi, Katsumi; Hiratsuka, Kosai; Yoshinaga, Shoji; Nakatsui, Toji; Oda, Chikao; and Fujiwara, Kiyoshi, 4,698,142, Cl. 204-182.300.
Hirohashi, Kazutoshi: *See*—
Ishigaki, Yukinobu; Namiki, Yasuomi; Fujiwara, Hisashige; and Hirohashi, Kazutoshi, 4,698,693, Cl. 358-310.000.
Hiroi, Kazuo; and Ito, Kojiro, to Kabushiki Kaisha Toshiba. Process control apparatus for optimal adaptation to a disturbance. 4,698,745, Cl. 364-165.000.
Hirono, Akira: *See*—
Kitamura, Masaharu; and Hirono, Akira, 4,698,735, Cl. 362-230.000.
Hirooka, Kazuhiko: *See*—
Hayashi, Kimiyoshi; Ohno, Akio; Hirooka, Kazuhiko; and Murayama, Yasushi, 4,697,915, Cl. 355-14.00D.
Hirose, Haruomi; and Atobe, Takashi, to Daiwa Seiko, Inc. Fishing reel with microcomputer. 4,697,758, Cl. 242-84.10M.
Hirose, Masayuki: *See*—
Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, 4,697,916, Cl. 355-14.00E.
Hirt, Walter, to Emhart Industries, Inc. Take-out mechanism for a glassware forming machine. 4,698,087, Cl. 65-172.000.
Hirth, Antoine; and Simon, Antoine, to Institut Franco-Allemand de Recherches de Saint-Louis. Power supply unit for a laser tube. 4,698,819, Cl. 372-38.000.
Hisada, Nobuo: *See*—
Inoue, Atsuo; Miyamoto, Kazuhiro; Hisada, Nobuo; and Okinaga, Nobuyuki, 4,698,105, Cl. 149-2.000.
Hisey, Durward A., to Hy-C Company, Inc. Adjustable chimney cap support. 4,697,500, Cl. 98-67.000.
Hitachi Automotive Engineering Co., Ltd.: *See*—
Ito, Hiroshi; Kugo, Masaru; and Watanate, Sizuhisa, 4,697,886, Cl. 350-336.000.
Hitachi Chemical Co., Ltd.: *See*—
Koibuchi, Shigeru; Isobe, Asao; and Makino, Daisuke, 4,698,291, Cl. 430-196.000.
Hitachi Construction Machinery Co., Ltd.: *See*—
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.
Hitachi Denshi Kabushiki Kaisha: *See*—
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Hitachi, Ltd.: *See*—
Aizawa, Iwao, 4,698,601, Cl. 331-1.00A.
Daiko, Yoichi; Masuda, Masami; and Terabayashi, Takao, 4,697,964, Cl. 408-6.000.
Eto, Yoshizumi; Umemoto, Masuo; Kanada, Hidehiro; and Mita, Seiichi, 4,698,811, Cl. 371-38.000.
Fukuda, Yasushi; Oka, Takafumi; and Tanaka, Kazuo, 4,698,810, Cl. 371-38.000.
Ishihara, Joo; Ogawa, Toshio; Era, Masashi; and Sato, Ken-ichi, 4,697,320, Cl. 29-132.000.
Ito, Hiroshi; Kugo, Masaru; and Watanate, Sizuhisa, 4,697,886, Cl. 350-336.000.
Koibuchi, Shigeru; Isobe, Asao; and Makino, Daisuke, 4,698,291, Cl. 430-196.000.
Komuro, Matahiro; Kozono, Yuzo; Yasuda, Takeshi; Narishige, Shinji; Hanazono, Masanobu; and Kuroda, Tetsuro, 4,698,273, Cl. 428-635.000.
Matsuzaki, Harumi; Kubota, Masayoshi; Ebara, Katsuya; Takahashi, Sankichi; and Kuroiwa, Minoru, 4,698,153, Cl. 210-192.000.
Mori, Kinji; Miyamoto, Shoji; and Ihara, Hirokazu, 4,698,629, Cl. 340-825.050.
Muroi, Katsumi; Hiratsuka, Kosai; Yoshinaga, Shoji; Nakatsui, Toji; Oda, Chikao; and Fujiwara, Kiyoshi, 4,698,142, Cl. 204-182.300.
Nomura, Setsuo; Kubozoe, Morioki; and Isakozawa, Shigeto, 4,698,503, Cl. 250-311.000.
Ohnari, Mikihiko; Funabashi, Motohisa; Shioya, Makoto; Sekozawa, Teruji; and Shida, Masami, 4,697,566, Cl. 123-479.000.
Okazaki, Kenichi; Morimoto, Kunio; Sawano, Kazumi; and Aoki, Masami, 4,698,755, Cl. 364-519.000.
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Hiwada, Kunio: *See*—
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Hiyane, Masao, to Fujitsu Limited. Multi-articulated robot. 4,697,472, Cl. 74-479.000.
Ho, Chien-Han. Process to manufacture control cable. 4,697,341, Cl. 29-871.000.
Ho, Teh C.; Chianelli, Russell R.; Jacobson, Allan J.; and Young, Archie R., to Exxon Research and Engineering Company. Supported transition metal sulfide promoted molybdenum or tungsten sulfide catalysts and their uses for hydroprocessing. 4,698,145, Cl. 208-18.000.
Hoag, Ethan D., to Laser Corporation of America. Discharge electrode for a gas discharge device. 4,698,551, Cl. 313-619.000.
Hochtemperatur-Reaktorbau GmbH: *See*—
Ehlers, Claus; and Schoening, Josef, 4,698,203, Cl. 376-343.000.
Wachholz, Winfried; and Weicht, Ulrich, 4,698,202, Cl. 376-300.000.
Hoechst Aktiengesellschaft: *See*—
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Hoeffkes, Horst; and Schrader, Dieter, to Henkel Kommanditgesellschaft auf Aktien. Liquid oxidation hair dye with phase stabilizer. 4,698,065, Cl. 8-406.000.
Hoffmann-La Roche Inc.: *See*—
Farrenkopf, Bruce C.; and Kaufman, Richard A., 4,698,315, Cl. 436-536.000.
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Daube, Bruce C., Jr.; Flagan, Richard C.; and Hoffmann, Michael R., 4,697,462, Cl. 73-863.210.
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Holcomb, David A.; and Tryon, James A., to Fite, F. Bartow. Combination condiment grinder and dispenser. 4,697,749, Cl. 241-169.000.
Holden, Ian; and Malings, Michael J., to International Business Machines Corporation. Graphic display with determination of coincidence of subject and clip areas. 4,698,779, Cl. 364-520.000.
Holdener, Franz. Credit and identification card holder. 4,697,698, Cl. 206-39.400.
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Holt, Richard C., to Augat Inc. Wire mat mateable with a circuit board. 4,698,275, Cl. 428-40.000.
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Benander, Robert E.; and Holzl, Robert A., 4,698,244, Cl. 427-253.000.
Holzle, Roland, to Hafele KG. Guide mechanism, particularly for sliding furniture parts. 4,697,934, Cl. 384-19.000.
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Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.
Honda Giken Kogyo, K.K.: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.
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Honda Giken Kogyo Kabushiki Kaisha: *See*—
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Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,697,825, Cl. 280-703.000.
Ida, Jinsei; Hagimoto, Yoshio; and Ishikawa, Makoto, 4,697,965, Cl. 408-56.000.
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,697,816, Cl. 280-91.000.
Kawasaki, Katsuyoshi, 4,697,842, Cl. 296-78.100.
Kikuchi, Uhee; Nozaki, Hiroyoshi; Fukuda, Masao; and Satake, Toshihiko, 4,698,005, Cl. 425-163.000.
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Otobe, Yutaka; Niikura, Masakatsu; and Wazaki, Yoshio, 4,697,421, Cl. 60-602.000.
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Tagami, Tomoyuki, 4,697,824, Cl. 280-701.000.
Tanaka, Haruma; and Ohashi, Yasuo, 4,697,445, Cl. 72-68.000.
Honda, Kusuo: *See*—
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Honda, Tadashi; and Nakanishi, Toshihiro, to Suntory Limited. Ellipticine derivative and production process thereof. 4,698,423, Cl. 536-24.000.
Honeywell Inc.: *See*—
Abbott, Richard C.; and Vydyanath, Honnavalli R., 4,697,543, Cl. 118-412.000.
Doddapaneni, Narayan, 4,698,283, Cl. 429-101.000.
Howard, James W., 4,697,866, Cl. 350-1.400.
Loeb, Phillip J., 4,698,619, Cl. 340-384.00E.
Plagens, Mark R., 4,698,524, Cl. 307-450.000.

Hoogendoorn, Thomas M.; de Haas, Maarten A.; and Nijman, Johan M., to Hoogovens Groep B.V. Method of manufacturing dual phase strip steel and steel strip manufactured by the method. 4,698,103, Cl. 148-12.00F.

Hoogovens Groep B.V.: *See*—
Hoogendoorn, Thomas M.; de Haas, Maarten A.; and Nijman, Johan M., 4,698,103, Cl. 148-12.00F.

Hooper, Anthony W., to Uniweld Inc. Rotary pulp screen of the horizontal type having pulp stock feed at different axial positions on the screen. 4,697,982, Cl. 415-121.00G.

Hopfer, David M. Adjustable layout square. 4,697,351, Cl. 33-420.000.

Hori, Kimihiko: *See*—
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Horibe, Yasutaka: *See*—
Takubo, Yoneharu; Horibe, Yasutaka; and Yamanishi, Nobue, 4,697,889, Cl. 350-392.000.

Horiguchi, Shojiro: *See*—
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Horii, Yoshiharu: *See*—
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Horiike, Yasuhiro: *See*—
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Horiishi, Nanao: *See*—
Nagai, Norimichi; Horiishi, Nanao; Kiyama, Masao; and Takada, Toshio, 4,698,182, Cl. 252-62.590.

Horiuchi, Tatumi, to Konishiroku Photo Industry Co., Ltd. Controlling method for a sorter. 4,697,806, Cl. 271-288.000.

Horowitz, Bruce S., to Henry Ford Hospital. Delivery system for interstitial radiation therapy including substantially non-deflecting elongated member. 4,697,575, Cl. 128-1.200.

Horphag Overseas Ltd.: *See*—
Masquelier, Jack, 4,698,360, Cl. 514-456.000.

Horres, Johannes: *See*—
Bengl, Dieter; and Horres, Johannes, 4,698,085, Cl. 65-16.000.

Horriere, Daniel; and Chazalet, Maurice, to Rhone-Poulenc Agrochimie. Fungicidal compositions based on alkyl phosphites. 4,698,334, Cl. 514-141.000.

Hosoya, Takamasa: *See*—
Takamura, Koji; Hosoya, Takamasa; and Kobayashi, Kazunari, 4,697,894, Cl. 350-574.000.

Hotchkiss, Kenneth W.; and Woodward, Arthur B., to Proto-Tel, Inc. Terminal block cover. 4,697,720, Cl. 220-337.000.

Hotze, Robert B.: *See*—
Witten, Mark A.; Hotze, Robert B.; and Stephenson, Leonard E., 4,697,767, Cl. 244-158.00R.

Howard, James W., to Honeywell Inc. Apparatus and method for fabricating a sandwich lens. 4,697,866, Cl. 350-1.400.

Howard, Mig A.: *See*—
Kelly, Joseph L., Jr.; Howard, Mig A.; Nysen, Paul A.; and Hacking, Colin A., 4,698,631, Cl. 340-853.000.

Howe, Michael; and Schwarz, Waldemar, to Aumund-Fordererbau GmbH Maschinenfabrik. Plate belt conveyor. 4,697,696, Cl. 198-822.000.

Howell, Edward K., to General Electric Company. High speed contact driver for circuit interruption device. 4,698,607, Cl. 335-195.000.

Howmedica International, Inc.: *See*—
Richter, Karl M.; and Harder, Hans E., 4,698,579, Cl. 320-14.000.

Howmet Turbine Components Corporation: *See*—
Lirones, Nick G., 4,697,632, Cl. 164-369.000.

HTC Corporation, The: *See*—
Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., 4,697,730, Cl. 228-37.000.

Hubbard, Dohn D., II, to Precision Handling Devices, Inc. Document feed tractor. 4,697,727, Cl. 226-74.000.

Hubbins, Stephen J.; England, David G.; Szczepanek, Andre; and Norvall, David, to Texas Instruments Incorporated. Multiprocessor interface device. 4,698,753, Cl. 364-200.000.

Huber, Thomas, to Electro-Pneumatic-International GmbH. Roller drive unit. 4,697,694, Cl. 198-782.000.

Huebner, Klemens: *See*—
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Hughes Aircraft Company: *See*—
Beasley, James E.; and Lindsey, Steven M., 4,698,521, Cl. 307-270.000.

Hughes Helicopters, Inc.: *See*—
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Hughes, Richard P.: *See*—
So, Vincent C.; Hughes, Richard P.; and Vella, Paul J., 4,697,869, Cl. 350-96.150.

Hughes Tool Company: *See*—
Briggs, Garry L., 4,698,168, Cl. 252-8.553.
Kelly, Joseph L., Jr.; Howard, Mig A.; Nysen, Paul A.; and Hacking, Colin A., 4,698,631, Cl. 340-853.000.

Hulin, Jean Pierre: *See*—
Bouvard, Andre ; and Hulin, Jean Pierre, 4,697,873, Cl. 350-96.230.

Hulsen, Ralf: *See*—
Grethe, Klaus; Eickhoff, Heinrich; Goller, Elmar; and Hulsen, Ralf, 4,698,014, Cl. 431-9.000.

Hunter Douglas Inc.: *See*—
Anderson, Richard N., 4,697,629, Cl. 160-177.000.

Hupf, Charles J., to Regal Ware, Inc. Stiffening spring hose clamp. 4,697,501, Cl. 99-279.000.

Hupfer, Leopold: *See*—
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Husted, Raymond R.: *See*—
Carter, Jeff C.; and Husted, Raymond R., 4,698,772, Cl. 364-900.000.

Huttinger, Rudolf; Kollmeier, Hans-Joachim; Langenhagen, Rolf-Dieter; Walter, Alfred; and Wolfes, Wilhelm, to Th. Goldschmidt AG. Use of polyoxyalkylene-polysiloxane copolymers with silicon-linked, long-chain alkyl radicals as emulsifiers for the preparation of water/oil emulsions. 4,698,178, Cl. 252-309.000.

Huttlin, Herbert. Fluidized bed apparatus. 4,697,356, Cl. 34-57.00A.

Hutton, Robert A. Pliers gripping band. 4,697,482, Cl. 81-64.000.

Hwang, Yin-Chao; and Powell, Theo J., to Texas Instruments Incorporated. Transparent shift register latch for isolating peripheral ports during scan testing of a logic circuit. 4,698,588, Cl. 324-73.00R.

Hy-C Company, Inc.: *See*—
Hisey, Durward A., 4,697,500, Cl. 98-67.000.

Hy-Meg Corporation: *See*—
Pedersen, David; and Cupidro, Vincent N., 4,697,335, Cl. 29-620.000.

Hyatt, Robert L.: *See*—
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Hydro Quebec: *See*—
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Hydro Systems Company: *See*—
Bricker, James C.; and Lippman, David H., 4,697,610, Cl. 137-3.000.

Hyodo, Hiroshi; Yamada, Naoki; Iwase, Kenichi; and Kishimoto, Shinichi, to Kabushiki Kaisha Kyoto Daiichi Kagaku. Method of measurement using scattered light. 4,697,925, Cl. 356-339.000.

IABP Corporation: *See*—
Schiff, Peter, 4,697,573, Cl. 128-1.00D.

Ichii, Hirokazu: *See*—
Koda, Takao; Ichii, Hirokazu; and Komatuzaki, Hiroshi, 4,697,903, Cl. 354-288.000.

Ichijima, Seiji; and Sasaki, Noboru, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive material. 4,698,297, Cl. 430-383.000.

Ichikoh industries Limited: *See*—
Tanaka, Morimasa; and Kyoden, Tatsuo, 4,698,463, Cl. 200-5.00R.
Tanaka, Morimasa; and Ito, Shinichiro, 4,698,464, Cl. 200-5.00R.

Ichiryu, Taku: *See*—
Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mouri, Yasushi; and Kobayashi, Masanori, 4,697,987, Cl. 416-204.00A.

Ida, Jinsei; Hagimoto, Yoshio; and Ishikawa, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for preventing invasion of cutting liquid in replaceable head type machine tool. 4,697,965, Cl. 408-56.000.

Idemitsu Petrochemical Co., Ltd.: *See*—
Sinclair, Richard G.; Benecke, Herman P.; and Sowell, Sylvester, 4,698,415, Cl. 528-388.000.

Ihara, Hirokazu: *See*—
Mori, Kinji; Miyamoto, Shoji; and Ihara, Hirokazu, 4,698,629, Cl. 340-825.050.

Ihlenburg, Rainer; Baitz, Guenter; and Nixdorf, Heinz, to Nixdorf Computer AG. Carrier arrangement for magnetic heads of magnetic disk drive assembly. 4,698,709, Cl. 360-104.000.

Iida, Shigeki: *See*—
Toya, Tomohiro; Hara, Hajime; Iida, Shigeki; and Satoh, Tetsuo, 4,698,397, Cl. 525-437.000.

Iizuka, Tetsuya, to Kabushiki Kaisha Toshiba. MOS semiconductor device. 4,698,789, Cl. 365-226.000.

Ikeda, Junichi: *See*—
Kohata, Toshihide; Miyazaki, Masaru; Sato, Yoshihisa; and Ikeda, Junichi, 4,697,408, Cl. 57-264.000.

Ikeda, Mitsuru, to Fuji Photo Film Co., Ltd. Device for measuring the number of bacteria in superpure water. 4,698,308, Cl. 435-291.000.

Ikeda, Toshiki; Beppu, Yoshitugu; Yamamoto, Takashi; Ishigaki, Hideyo; and Ohmura, Hiroshi, to Sekisui Kaseihin Kogyo Kabushiki Kaisha; and Nippon Oil and Fats Co., Ltd. Expandable thermoplastic resin particles. 4,698,367, Cl. 521-57.000.

Imai, Tetsuya; Fujita, Hiroshi; Koikeda, Minoru; and Suzuki, Takashi, to Research Association for Petroleum Alternatives Development. Crystalline silicates, and processes for the production or use thereof. 4,698,449, Cl. 585-469.000.

Imamura, Eiji; Kumokawa, Takashi; Nakayama, Fumio; Mandai, Haruhumi; Fukutani, Iwao; and Tomono, Kunisaburo, to Murata Manufacturing Co., Ltd. Monolithic LC feed-through filter having a ferrite body with a re-oxidized capacitive layer. 4,698,605, Cl. 333-184.000.

Imperial Chemical Industries PLC: *See*—
Andrew, Sydney P. S.; and Jennings, James R., 4,698,325, Cl. 502-330.000.

Inaba, Michihiko; Fujiwara, Tetsuo; Kanto, Masaharu; Ohtake, Yasuhisa; and Mori, Fumio, to Kabushiki Kaisha Toshiba. Color picture tube having a shadow mask with a Cr enriched layer. 4,698,545, Cl. 313-402.000.

Inagaki, Takafumi; Sasaoka, Hiroshi; Masutomi, Susumu; Itoh, Hiroshi; and Takada, Mitsuru, to Toyota Jidosha Kabushiki Kaisha. Diagnostic apparatus for continuously variable transmission. 4,698,764, Cl. 364-424.100.

Inamoto, Tadayoshi, to Canon Kabushiki Kaisha. Ink-jet recording head with an improved bonding arrangement for the substrate an cover comprising the head. 4,698,645, Cl. 346-140.00R.
Industrie Pirelli S.p.A: *See*—
Tangorra, Giorgio, 4,697,674, Cl. 188-298.000.
Ingersoll Cutting Tool Company: *See*—
Luck, Edwin, 4,697,963, Cl. 407-105.000.
Inko Industrial Corporation: *See*—
Ying, Minghaw, 4,697,701, Cl. 206-316.000.
Inman, Charles M.: *See*—
Graham, William M.; Vaughn, Wade C.; and Inman, Charles M., 4,697,697, Cl. 206-5.100.
Inmos Corporation: *See*—
Allan, James D., 4,698,526, Cl. 307-475.000.
Inokuma, Hiroyuki: *See*—
Mine, Kiyomitsu; Kobayashi, Yayoi; Kawaguchi, Yasushi; and Inokuma, Hiroyuki, 4,698,280, Cl. 428-425.900.
Inokuti, Yukio; and Ito, Yo, to Kawasaki Steel Corporation. Extra-low iron loss grain oriented silicon steel sheets. 4,698,272, Cl. 428-627.000.
Inoue, Atsuo; Miyamoto, Kazuhiro; Hisada, Nobuo; and Okinaga, Nobuyuki, to Nippon Kayaku Kabushiki Kaisha. Water-in-oil type emulsion explosives. 4,698,105, Cl. 149-2.000.
Inoue, Hiroshi: *See*—
Amatsu, Masashi; Yanase, Takeyasu; Inoue, Hiroshi; and Nakagawa, Yusuke, 4,698,786, Cl. 365-39.000.
Inoue, Naomitsu: *See*—
Saeki, Yukio; Inoue, Naomitsu; and Tokunaga, Yukio, 4,698,370, Cl. 521-128.000.
Inoue, Senya; Ono, Akira; Kobayashi, Mikio; and Yokoo, Hiroshi, to Kanto Kagaku Kabushiki Kaisha. Porous cordierite ceramica, a process for producing same and use of the porous cordierite ceramics. 4,698,317, Cl. 501-9.000.
Inoue, Shinsuke. Golf club. 4,697,813, Cl. 273-167.00H.
Inoue, Takashi: *See*—
Nakanishi, Koichi; Onaka, Toshio; and Inoue, Takashi, 4,698,224, Cl. 426-11.000.
Inoue, Takayuki; Hattori, Masafumi; Hayama, Kazuhide; and Maruta, Riichiro, to Mitsubishi Petrochemical Co., Ltd. Process of purifying maleic anhydride-modified polyolefin. 4,698,395, Cl. 525-327.800.
Inoue, Takehisa: *See*—
Miwa, Kishio; Nagaoka, Yukiko; and Inoue, Takehisa, 4,698,453, Cl. 585-828.000.
Institut Franco-Allemand de Recherches de Saint-Louis: *See*—
Hirth, Antoine; and Simon, Antoine, 4,698,819, Cl. 372-38.000.
Institut Gornogo Dela Sibirskogo Otdelenia Akademii Nauk SSSR: *See*—
Kostylev, Alexandr D.; Plavskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., 4,697,647, Cl. 173-91.000.
Institut Nationale de la Recherche Scientifique: *See*—
Le Van Mao, Raymond; and Dao, Le H., 4,698,452, Cl. 585-640.000.
Intech-Systems, Inc.: *See*—
Larsen, Theodore E., 4,698,758, Cl. 364-419.000.
Intermedicat GmbH: *See*—
Schmidt, Karl-Heinz; and Feller, Wolfgang, 4,698,387, Cl. 525-54.100.
International Business Machines: *See*—
Drago, Gary A.; Baier, Walter F.; Lee, Francis C.; Mills, Ross N.; and Mossbrugger, Horst G., 4,698,644, Cl. 346-140.00R.
Lembach, Robert F.; Lewis, Steven D.; and Williams, Robert R., 4,698,760, Cl. 364-490.000.
International Business Machines Corp.: *See*—
Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., 4,698,624, Cl. 340-709.000.
Barzilai, Zeev; Iyengar, Vijay S.; and Silberman, Gabriel M., 4,698,830, Cl. 377-19.000.
Bednorz, Johannes G.; Gimzewski, James K.; and Reihl, Bruno, 4,698,502, Cl. 250-306.000.
Cavaliere, Joseph R.; Chang, Albert Y.; and Robortaccio, Rocco J., 4,698,800, Cl. 370-24.000.
Chapman, Dale B., 4,698,600, Cl. 331-1.00A.
Dill, David M.; and Redmond, Holly F., 4,698,757, Cl. 364-300.000.
Hedman, Robert L., 4,698,599, Cl. 330-252.000.
Holden, Ian; and Malings, Michael J., 4,698,779, Cl. 364-520.000.
Ishii, Takashi, 4,698,808, Cl. 371-21.000.
Jones, Gerald W.; Pratt, W. Robert; and Summa, William J., 4,697,923, Cl. 356-239.000.
Marple, Wendell P.; and Miller, Hubert A., 4,698,528, Cl. 307-517.000.
McCaskill, Rex A.; and Wang, John S., 4,698,625, Cl. 340-709.000.
Vinal, Albert W., 4,698,711, Cl. 360-113.000.
International Oxygen Company, Inc.: *See*—
Dechene, Fernand J., 4,698,075, Cl. 55-163.000.
International Paper Company: *See*—
Gibbons, Charles E.; Whillock, Allan A.; Lanham, Robert L.; and Kinsey, Joe L., Jr., 4,698,246, Cl. 428-35.000.
International Standard Electric Corporation: *See*—
Bertocchi, Giuseppe, 4,698,637, Cl. 342-399.000.
Ion Beam Systems, Inc.: *See*—
Kellogg, Edwin M.; Dobbs, John M.; Dunn, Gregory J.; Kaufmann, Henry C.; and Thompson, William, 4,698,236, Cl. 427-43.100.
Ionescu, Dragos; and Soiman, Mihai, to Wedtech Corp. Electronic ignition circuit with automatic control advance. 4,697,570, Cl. 123-602.000.
Ireland, Anthony J.: *See*—
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.
Isakozawa, Shigeto: *See*—
Nomura, Setsuo; Kubozoe, Morioki; and Isakozawa, Shigeto, 4,698,503, Cl. 250-311.000.
Isbell, Wayne: *See*—
Kastendieck, William A.; Hart, Richard T.; and Isbell, Wayne, 4,697,783, Cl. 248-900.000.
Isetron Industrie-und Sicherheits-Elektronik GmbH: *See*—
Pitter, Andreas; and Stenkamp, Werner, 4,697,798, Cl. 267-70.000.
Ishibashi, Hideyuki: *See*—
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, 4,697,469, Cl. 74-117.000.
Ishida, Tomonobu: *See*—
Furukawa, Toshiharu; Shimura, Susumu; Takai, Fumio; Sano, Norio; and Ishida, Tomonobu, 4,697,532, Cl. 110-346.000.
Ishigaki, Hideyo: *See*—
Ikeda, Toshiki; Beppu, Yoshitugu; Yamamoto, Takashi; Ishigaki, Hideyo; and Ohmura, Hiroshi, 4,698,367, Cl. 521-57.000.
Ishigaki, Yukinobu; Namiki, Yasuomi; Fujiwara, Hisashige; and Hiroshi, Kazutoshi, to Victor Company of Japan, Ltd. Audio magnetic recording and/or reproducing apparatus utilizing frequency modulation. 4,698,693, Cl. 358-310.000.
Ishihara, Joo; Ogawa, Toshio; Era, Masashi; and Sato, Ken-ichi, to Hitachi, Ltd. Roll for a rolling mill, method of producing the same and the rolling mill incorporating the roll. 4,697,320, Cl. 29-132.000.
Ishii, Masahiro: *See*—
Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, 4,697,453, Cl. 73-290.00R.
Ishii, Takashi, to International Business Machines Corporation. Method for detecting intermittent error in volatile memory. 4,698,808, Cl. 371-21.000.
Ishikawa, Makoto: *See*—
Ida, Jinsei; Hagimoto, Yoshio; and Ishikawa, Makoto, 4,697,965, Cl. 408-56.000.
Ishikawa, Mamoru: *See*—
Sakura, Yasuhiro; Haraga, Koichi; Nimura, Hitoshi; and Ishikawa, Mamoru, 4,697,938, Cl. 400-120.000.
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, to Aisin Seiki Kabushiki Kaisha; and Toyoda Gosei Co., Ltd. Steering wheel having a telephone. 4,698,838, Cl. 379-58.000.
Ishikawa, Tadashi: *See*—
Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; and Endo, Takashi, 4,698,650, Cl. 346-134.000.
Ishiki, Naotsugu; and Takei, Yuji, to Sanden Corporation. Stirling cycle engine. 4,697,420, Cl. 60-517.000.
Ishizaki, Akira: *See*—
Ohtaka, Keiji; Hiramatsu, Akira; Suda, Yasuo; Akashi, Akira; and Ishizaki, Akira, 4,698,492, Cl. 250-201.000.
Ishizawa, Tadao; Kotaka, Hirofumi; and Kakinuma, Masami, to Seiko Seiki Kabushiki Kaisha. Multistage discharge type rotary vacuum pump. 4,697,994, Cl. 418-8.000.
Isobe, Asao: *See*—
Koibuchi, Shigeru; Isobe, Asao; and Makino, Daisuke, 4,698,291, Cl. 430-196.000.
Itani, Kiyoshi; Tokizaki, Hisashi; Funagoshi, Tomohide; Ohtsuka, Nobuo; Ohkubo, Katsuhiro; and Katsuki, Hikaru, to Sanyo Electric Co., Ltd. Inverter apparatus. 4,698,744, Cl. 364-140.000.
Ito, Hiroshi; Kugo, Masaru; and Watanate, Sizuhisa, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Color liquid crystal display device with interdigited segment electrodes. 4,697,886, Cl. 350-336.000.
Ito, Kojiro: *See*—
Hiroi, Kazuo; and Ito, Kojiro, 4,698,745, Cl. 364-165.000.
Ito, Makoto: *See*—
Abe, Nobuhide; Adachi, Minoru; Ito, Makoto; and Uchida, Toshiya, 4,698,774, Cl. 364-477.000.
Ito, Masahiro; Murayama, Noboru; Suziku, Koichi; Sato, Kei; and Sato, Tsutomu, to Ricoh Company, Ltd. Method of processing gradation information with variable magnification. 4,698,778, Cl. 364-518.000.
Ito, Masahiro: *See*—
Suzuki, Koichi; Murayama, Noboru; Ito, Masahiro; and Sato, Kei, 4,698,691, Cl. 358-283.000.
Ito, Masayoshi: *See*—
Ogasawara, Sadanori; Hanafusa, Takashi; Kariya, Katsuhide; Ito, Masayoshi; and Shitori, Yoshiyasu, 4,698,332, Cl. 514-42.000.
Ito, Shinichiro: *See*—
Tanaka, Morimasa; and Ito, Shinichiro, 4,698,464, Cl. 200-5.00R.
Ito, Tetuzo: *See*—
Goto, Masao; Kimura, Haruo; Okada, Toshihiko; Yuasa, Katsunori; and Ito, Tetuzo, 4,697,708, Cl. 209-534.000.
Ito, Yo: *See*—
Inokuti, Yukio; and Ito, Yo, 4,698,272, Cl. 428-627.000.
Itoh, Hiroshi: *See*—
Inagaki, Takafumi; Sasaoka, Hiroshi; Masutomi, Susumu; Itoh, Hiroshi; and Takada, Mitsuru, 4,698,764, Cl. 364-424.100.
Suzuki, Yasutoshi; Itoh, Hiroshi; Ohmi, Shinya; and Hara, Kunihiko, 4,697,883, Cl. 350-331.00R.
Itoh, Yuji: *See*—
Takahashi, Kazuhisa; Kawasaki, Keiichi; and Itoh, Yuji, 4,698,648, Cl. 346-108.000.

ITT Corporation: *See—*
Kennedy, Paul G., 4,697,786, Cl. 251-309.000.
Ivy, Eugene W. Mist generator with piercing member. 4,697,740, Cl. 239-271.000.
Iwaki, Hiroshi: *See—*
Kan, Yuji; and Iwaki, Hiroshi, 4,697,803, Cl. 271-127.000.
Iwaki, Masaya: *See—*
Ohira, Shigeo; and Iwaki, Masaya, 4,698,233, Cl. 427-38.000.
Iwase, Kenichi: *See—*
Hyodo, Hiroshi; Yamada, Naoki; Iwase, Kenichi; and Kishimoto, Shinichi, 4,697,925, Cl. 356-339.000.
Iwashita, Yoshiharu: *See—*
Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, 4,697,453, Cl. 73-290.00R.
Iwata, Hitoshi: *See—*
Minami, Katsuhiro; Iwata, Hitoshi; and Kinoshita, Kenichi, 4,698,552, Cl. 315-82.000.
Iyengar, Vijay S.: *See—*
Barzilai, Zeev; Iyengar, Vijay S.; and Silberman, Gabriel M., 4,698,830, Cl. 377-19.000.
J. L. Wickham Company, Incorporated, The: *See—*
Wickham, John L.; Fox, Jeffrey D.; and Miller, Ross C., 4,697,318, Cl. 29-33.00P.
Wickham, John L.; and Fox, Jeffrey D., 4,697,799, Cl. 269-32.000.
Jabs, Robert H., to Westinghouse Electric Corp. Method and apparatus for verifying the seismic integrity of an electronic component. 4,697,461, Cl. 73-862.530.
Jacklin, Keith A.: *See—*
Koch, G. Teryl; Smith, Thomas L.; Jacklin, Keith A.; and Hammond, James A., 4,698,252, Cl. 428-159.000.
Jacobson, Allan J.: *See—*
Ho, Teh C.; Chianelli, Russell R.; Jacobson, Allan J.; and Young, Archie R., 4,698,145, Cl. 208-18.000.
Jacobson, Ralph S. Plastic bag opening device. 4,698,051, Cl. 493-309.000.
Jagenberg Aktiengesellschaft: *See—*
Zodrow, Rudolf; and Buchholz, Rainer, 4,697,691, Cl. 198-425.000.
Jager, Gerhard: *See—*
Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.
James, Richard A.: *See—*
Gallagher, Nicholas D.; Sternasty, Richard S.; and James, Richard A., 4,698,248, Cl. 428-41.000.
James, Steven P.; Karr, Roger W.; and Swanson, Gary L. Apparatus for slurrifying snow-debris. 4,697,572, Cl. 126-343.50R.
Janecek, Kenneth F.: *See—*
Davis, Steven S.; Mueller, Max A.; and Janecek, Kenneth F., 4,697,511, Cl. 100-37.000.
Janiszewski, Grzegorz K., to AB Volvo. Motor vehicle clutch for a mechanical, multiple-speed automatic transmission. 4,697,677, Cl. 192-48.910.
Janoff, Andrew S.; Rauch, Joyce; and Tilcock, Colin P. S., to Liposome Company, Inc., The. Lipid-dependent diagnostic assays. 4,698,299, Cl. 435-13.000.
Janome Sewing Machine Industry Co., Ltd.: *See—*
Takenoya, Hideaki; and Mishima, Fumiyuki, 4,697,941, Cl. 400-185.000.
Jansons, Viktors; Gors, Heinrich C.; Moore, Stephen; Reamey, Robert H.; and Becker, Paul, to Raychem Corporation. Preparation of poly(arylene ether ketones). 4,698,393, Cl. 525-242.000.
Janssen, Peter J. M.: *See—*
Faber, Johannes W.; and Janssen, Peter J. M., 4,698,798, Cl. 369-219.000.
Japan Tobacco, Inc.: *See—*
Kohata, Toshihide; Miyazaki, Masaru; Sato, Yoshihisa; and Ikeda, Junichi, 4,697,408, Cl. 57-264.000.
Jarveaux, Frank: *See—*
Wood, Kenneth M.; and Jarveaux, Frank, 4,697,830, Cl. 285-27.000.
Jastrzebski, Lubomir L.: *See—*
Corboy, John F., Jr.; Pagliaro, Robert H., Jr.; Jastrzebski, Lubomir L.; and Soydan, Ramazan, 4,698,316, Cl. 437-89.000.
Jauch, Kurt. Rotary piston engine. 4,697,999, Cl. 418-191.000.
Jaumann, Leonhard; and Kus, Helmut, to Sachtler GmbH Filmtechnische Gerate. Vertically adjustable post for a film or television camera tripod. 4,697,773, Cl. 248-162.100.
Jefferson, Paul. Motor vehicle steering stabilizing apparatus. 4,697,817, Cl. 280-94.000.
Jeffery, Jon R.; and Pierce, Neil J., to McDonnell Douglas Corporation. Fast actuator. 4,697,419, Cl. 60-464.000.
Jennings, James R.: *See—*
Andrew, Sydney P. S.; and Jennings, James R., 4,698,325, Cl. 502-330.000.
Jensen, Eric. Fire starter. 4,698,068, Cl. 44-39.000.
Jensen, Ernst: *See—*
Penner, Horst; and Jensen, Ernst, 4,697,524, Cl. 102-498.000.
Jensen, Thomas H., to PPG Industries, Inc. Hollow fiber bushing and hollow fiber tip construction. 4,698,082, Cl. 65-1.000.
Jeppsson, Jan, to Boeing Company, The. Adaptive feed rate override system for a milling machine. 4,698,773, Cl. 364-474.000.
Jeromin, Lutz; Peukert, Eberhard; and Wollmann, Gerhard, to Henkel Kommanditgesellschaft auf Aktien. Process for the pre-esterification of free fatty acids in fats and oils. 4,698,186, Cl. 260-421.000.
Jeschke, Norbert: *See—*
Klee, Gerhard; Gerk, Wilfried; and Jeschke, Norbert, 4,697,484, Cl. 82-1.500.
Jeumont-Schneider Corporation: *See—*
Paeye, Gerard, 4,697,433, Cl. 62-235.100.
Jinno, Masatoshi: *See—*
Yoshizawa, Yasuo; and Jinno, Masatoshi, 4,698,574, Cl. 318-609.000.
Jiskoot, Sidney G. Disc cultivator shield. 4,697,645, Cl. 172-510.000.
Jobling, David T.; and Newton, Anthony D., to Motorola Inc. Timebase circuit. 4,698,556, Cl. 315-371.000.
Johansson, Karl A.: *See—*
Madsen, Henning S.; Sergero, Tommy S.; and Johansson, Karl A., 4,697,334, Cl. 29-594.000.
John A. Kitchen Ltd.: *See—*
Kitchen, John A., 4,697,358, Cl. 34-191.000.
Johns, Frederick W., Sr. Mechanic's creeper. 4,698,731, Cl. 362-61.000.
Johnson, Harold R., III; Phillips, Allyn E.; Carrigan, Erwin R.; Virgo, Richard A.; and Mickelson, James E., to Emerson Electric Co. Shaft aligned backstop for a reducer. 4,697,675, Cl. 192-7.000.
Johnson, Nigel, to EMI Limited. Video signal processing. 4,698,673, Cl. 358-140.000.
Johnson, Randall K.: *See—*
Hill, David T.; and Johnson, Randall K., 4,698,422, Cl. 536-17.100.
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., to Pharmaceutical Innovators Ltd. Pill storage and dispensing cassette. 4,697,721, Cl. 221-211.000.
Johnson, Theodore D., to Concept Polymer Technologies, Inc. Enteral feeding tubes. 4,698,059, Cl. 604-270.000.
Johnson, William M.; and Mere, Ilmar, to Ralph McKay Limited. Deep tillage sweep. 4,697,646, Cl. 172-730.000.
Johnston, Richard: *See—*
Shepley, Pete; Johnston, Richard; and Smith, Allan F., 4,697,350, Cl. 33-265.000.
Joishy, Suresh K. Built in assembly for stabilizing and securing intravascular needle or catheter like device. 4,698,057, Cl. 604-176.000.
Jolu, Etienne: *See—*
Dedieu, Alain; Lockhart, Campbell; and Jolu, Etienne, 4,698,298, Cl. 435-7.000.
Jones, Franklin B.; Milberger, Walter E.; Bulgher, David E.; and Kerfoot, Charles S., to United States of America, Air Force. High-voltage milberger slip slide power conditioner. 4,698,742, Cl. 363-124.000.
Jones, Gerald M.: *See—*
Sansome, Dennis H.; and Jones, Gerald M., 4,697,447, Cl. 72-283.000.
Jones, Gerald W.; Pratt, W. Robert; and Summa, William J., to International Business Machines Corporation. Method for visual inspection of multilayer printed circuit boards. 4,697,923, Cl. 356-239.000.
Jones, Henry W.: *See—*
Rando, Joseph F.; and Jones, Henry W., 4,698,479, Cl. 219-121.0LV.
Jones, Jack A., to United States of America, National Aeronautics and Space Administration. Oxygen chemisorption cryogenic refrigerator. 4,697,425, Cl. 62-48.000.
Jones, Keith L., to General Electric Company, p.l.c., The. Power-on reset circuit. 4,698,531, Cl. 307-592.000.
Jones, Wayne C.: *See—*
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.
Jones, Winton D., Jr.: *See—*
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Joseph Pollak Corporation: *See—*
Beck, Willi K.; and Danielson, Lincoln V., 4,698,466, Cl. 200-61.780.
Josephson, Lee: *See—*
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,698,302, Cl. 435-94.000.
Joshi, Dilip K.: *See—*
Bailey, Richard B.; Joshi, Dilip K.; Michaels, Stephen L.; and Wisdom, Richard A., 4,698,303, Cl. 435-139.000.
Joy, Richard C.; and Batra, Tarsaim L., to Gould Inc. Method of making tri-well CMOS by self-aligned process. 4,697,332, Cl. 437-29.000.
Julius Blum Gesellschaft m.b.H.: *See—*
Rock, Erich; and Hollenstein, Helmut, 4,697,946, Cl. 403-9.000.
Junkas, Ronald J. Portable weighing device. 4,697,655, Cl. 177-127.000.
Jurczynski, Myron: *See—*
Esgro, Michael; and Jurczynski, Myron, 4,697,381, Cl. 43-100.000.
Juzswik, David L.; Webb, Nathaniel; and Floyd, William M., to Essex Group, Inc. Power-conserving control system for turning-off the power and the clocking for data transactions upon certain system inactivity. 4,698,748, Cl. 364-200.000.
Kabelwerke Friedrich C. Ehlers: *See—*
Groschupp, Karl-Heinz; and Vreeke, Simon P., 4,697,522, Cl. 102-402.000.
Kabushiki Kaisha Irifune: *See—*
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Kabushiki Kaisha Kenwood: *See—*
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Kabushiki Kaisha Kyoto Daiichi Kagaku: *See—*
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Kabushiki Kaisha Murakoshi Seiko: *See*—
Harashima, Eiichi, 4,697,778, Cl. 248-349.000.
Kabushiki Kaisha Okawaraseisakusho: *See*—
Shibata, Takeo; and Nagasawa, Kazumasa. 4,698,190, Cl. 264-40.200.
Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Umino, Kunio, 4,698,705, Cl. 360-92.000.
Kabushiki Kaisha Tamura Seisakusho: *See*—
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Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Minami, Katsuhiro; Iwata, Hitoshi; and Kinoshita, Kenichi, 4,698,552, Cl. 315-82.000.
Kabushiki Kaisha Toshiba: *See*—
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Fujiki, Yutaka, 4,698,506, Cl. 250-363.00S.
Hayasaka, Nobuo; Okano, Haruo; and Horiike, Yasuhiro, 4,698,238, Cl. 427-53.100.
Higa, Osamu, 4,698,736, Cl. 363-51.000.
Hiroi, Kazuo; and Ito, Kojiro, 4,698,745, Cl. 364-165.000.
Iizuka, Tetsuya, 4,698,789, Cl. 365-226.000.
Inaba, Michihiko; Fujiwara, Tetsuo; Kanto, Masaharu; Ohtake, Yasuhisa; and Mori, Fumio, 4,698,545, Cl. 313-402.000.
Kaneko, Eiji; Yanabu, Satoru; and Tamagawa, Tohoru, 4,698,467, Cl. 200-144.00B.
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; and Takano, Takeshi, 4,698,320, Cl. 501-96.000.
Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, 4,697,902, Cl. 354-281.000.
Nakahara, Moriya, 4,697,333, Cl. 437-20.000.
Ono, Akira, 4,697,927, Cl. 356-360.000.
Ono, Katsuhiro; Sakuma, Tatsuya; and Takahashi, Hiroshi, 4,698,835, Cl. 378-136.000.
Onodera, Toshihiro; and Masuda, Youichi, 4,698,743, Cl. 363-136.000.
Sekizawa, Hidekazu; Kawakami, Haruko; and Yamamoto, Naofumi, 4,698,669, Cl. 358-76.000.
Shimamura, Takeo; Uchino, Hiroshi; and Kurosawa, Ryoichi, 4,698,581, Cl. 323-211.000.
Suzuki, Isamu, 4,697,985, Cl. 416-97.00R.
Toyoda, Keiji; and Suma, Sei, 4,697,430, Cl. 62-209.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Yoshikawa, Seiji; Sato, Isao; Nakayama, Shigenori; and Amazaki, Mitsuhiro, 4,697,498, Cl. 91-420.000.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Kamigaito, Osami; Doi, Haruo; and Noda, Shoji, 4,697,325, Cl. 29-447.000.
Nonomura, Yutaka; Sugiyama, Jun; Komatsubara, Hirofumi; and Takeuchi, Masaharu, 4,697,459, Cl. 73-862.360.
Sugiyama, Jun; Komatsubara, Hirofumi; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,697,460, Cl. 73-862.360.
Kabushiki Kaishi Toshiba: *See*—
Tojo, Toru; and Tabata, Mitsuo, 4,698,513, Cl. 250-561.000.
Kadlec, Joseph; and Kociolek, Kenneth W., to Zenith Electronics Corporation. Dual intensity video circuit. 4,698,681, Cl. 358-168.000.
Kaja, Dean M.: *See*—
Sawant, Ulhas S.; Karra, Vijia K.; and Kaja, Dean M., 4,697,745, Cl. 241-30.000.
Kajita, Hiroshi; Ujino, Koji; and Uehara, Yoshiyuki, to Mita Industrial Co., Ltd. Electrostatic copying apparatus. 4,697,911, Cl. 355-3.0SH.
Kajiwara, Yuji, to NEC Corporation. Amorphous silicon photo-sensor for a contact type image sensor. 4,698,495, Cl. 250-211.00R.
Kakinuma, Masami: *See*—
Ishizawa, Tadao; Kotaka, Hirofumi; and Kakinuma, Masami, 4,697,994, Cl. 418-8.000.
Kakizaki, Takehiro; and Araki, Shoji, to Sony Corporation. Image pickup apparatus. 4,698,558, Cl. 315-383.000.
Kalthoff, Rolf: *See*—
Schippers, Heinz; Gerhartz, Seigmar; and Kalthoff, Rolf, 4,697,753, Cl. 242-18.100.
Kamada, Minoru: *See*—
Fujii, Masahiro; Kamada, Minoru; and Matsubara, Shigeharu, 4,698,158, Cl. 210-610.000.
Kamata, Takao, to NEC Corporation. Output detector of a charge coupled device. 4,698,656, Cl. 357-24.000.
Kamigaito, Osami; Doi, Haruo; and Noda, Shoji, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Method for joining ceramic parts to metallic parts. 4,697,325, Cl. 29-447.000.
Kamiya, Takashi: *See*—
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, 4,698,336, Cl. 514-202.000.
Kamman, Gordon W., to Quaker Oats Company, The. Long-running motor-driven baby swing. 4,697,845, Cl. 297-118.000.
Kamui Company Ltd.: *See*—
Shibuya, Hisao; and Yusa, Tsunero, 4,697,321, Cl. 29-157.30R.
Kan, Yuji; and Iwaki, Hiroshi, to Sanyo Electric Co., Ltd. Sheet member feeding cassette. 4,697,803, Cl. 271-127.000.
Kanada, Hidehiro: *See*—
Eto, Yoshizumi; Umemoto, Masuo; Kanada, Hidehiro; and Mita, Seiichi, 4,698,811, Cl. 371-38.000.
Kaneko, Eiji; Yanabu, Satoru; and Tamagawa, Tohoru, to Kabushiki Kaisha Toshiba. Electrodes of vacuum switch. 4,698,467, Cl. 200-144.00B.
Kangaroos U.S.A., Inc.: *See*—
Gamm, Robert J., 4,697,363, Cl. 36-136.000.
Wasserman, Albert, 4,697,362, Cl. 36-136.000.
Kanno, Fukuo: *See*—
Nakaya, Keiichi; Tanaka, Kunio; Kanno, Fukuo; and Kobayashi, Mitaka, 4,698,379, Cl. 523-513.000.
Kano, Kuniomi: *See*—
Nishimuro, Yoshiaki; Hirata, Osamu; Kano, Kuniomi; Miyakawa, Akira; Fushimoto, Hideo; and Sekine, Kazumi, 4,698,783, Cl. 364-710.000.
Kanto Kagaku Kabushiki Kaisha: *See*—
Inoue, Senya; Ono, Akira; Kobayashi, Mikio; and Yokoo, Hiroshi, 4,698,317, Cl. 501-9.000.
Kanto, Masaharu: *See*—
Inaba, Michihiko; Fujiwara, Tetsuo; Kanto, Masaharu; Ohtake, Yasuhisa; and Mori, Fumio, 4,698,545, Cl. 313-402.000.
Kao Corporation: *See*—
Takaishi, Naotake; and Hori, Kimihiko, 4,698,435, Cl. 549-305.000.
Kappis, Fritz: *See*—
Hertweck, Gernot; Kappis, Fritz; Kellermann, Guenter; and Schalueck, Klaus, 4,697,569, Cl. 123-568.000.
Kaprelian, Edward K.: *See*—
Schwartz, Morris; and Kaprelian, Edward K., 4,698,683, Cl. 358-214.000.
Karashima, Toshiharu: *See*—
Aramaki, Jun; Karashima, Toshiharu; Magara, Takuji; and Ushida, Minoru, 4,698,477, Cl. 219-69.00R.
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, to Medicorp Research Laboratories Corp. Pump for assistance in circulation. 4,697,574, Cl. 128-1.00D.
Kariya, Katsuhide: *See*—
Ogasawara, Sadanori; Hanafusa, Takashi; Kariya, Katsuhide; Ito, Masayoshi; and Shitori, Yoshiyasu, 4,698,332, Cl. 514-42.000.
Karl Bauer Spezialtiefbau GmbH & Co. KG: *See*—
Bauer, Karlheinz; Haberer, Johann; and Arzberger, Maximilian M., 4,697,947, Cl. 403-14.000.
Karlsson, Ove; Ostling, Sture; and Adolfsson, Rune, to SKF Mekanprodukter AB. Bearing arrangement with a seal. 4,697,937, Cl. 384-486.000.
Karnovsky, Manfred L.: *See*—
Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, 4,698,330, Cl. 514-19.000.
Karr, Roger W.: *See*—
James, Steven P.; Karr, Roger W.; and Swanson, Gary L., 4,697,572, Cl. 126-343.50R.
Karra, Vijia K.: *See*—
Sawant, Ulhas S.; Karra, Vijia K.; and Kaja, Dean M., 4,697,745, Cl. 241-30.000.
Kasaoka, Katsuyuki: *See*—
Sasaki, Yoshiyuki; and Kasaoka, Katsuyuki, 4,698,260, Cl. 428-399.000.
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; and Takano, Takeshi, to Kabushiki Kaisha Toshiba. Aluminum nitride sintered body. 4,698,320, Cl. 501-96.000.
Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Mechanism for locking opened and closed states of baby carriage. 4,697,823, Cl. 280-644.000.
Kastendieck, William A.; Hart, Richard T.; and Isbell, Wayne, to Varo, Inc. Quick release night vision goggle mounting bracket. 4,697,783, Cl. 248-900.000.
Kasuya, Yukio, to Canon Kabushiki Kaisha. Image processor. 4,697,910, Cl. 355-3.00R.
Kataoka, Hiroshi. Rewinder with slitter. 4,697,755, Cl. 242-56.400.
Kataura, Yasuji: *See*—
Ototani, Tohei; and Kataura, Yasuji, 4,698,095, Cl. 75-58.000.
Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mouri, Yasushi; and Kobayashi, Masanori, to Mitsubishi Jukogyo Kabushiki Kaisha. Rotary machine having an impeller with a sleeve fixedly mounted to a shaft. 4,697,987, Cl. 416-204.00A.
Katayama, Nobuaki: *See*—
Sasaki, Kan; Takimura, Keisuke; and Katayama, Nobuaki, 4,697,470, Cl. 74-701.000.
Katayama, Yoshio: *See*—
Koizumi, Satoru; Teshima, Daisuke; and Katayama, Yoshio, 4,698,704, Cl. 360-74.100.
Katner, Allen S., to Eli Lilly and Company. 7[2-(2-aminothiazol-4-yl)-2-benzyloximino]acetamido-3[4-alkyl-5-oxo-6-hydroxy-3,4-dihydro-1,2,4-triazin-3-yl]thiomethyl cephalosporins. 4,698,338, Cl. 514-206.000.
Kato, Keishi: *See*—
Sato, Yoshimitsu; Ohtsuka, Shuichi; Kimura, Akinori; Yoda, Akira; Kato, Keishi; and Takahashi, Isoji, 4,697,912, Cl. 355-3.00R.
Kato, Nobuo: *See*—
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.
Kato, Toshiaki; Ueno, Masakazu; and Nishiura, Masaharu, to Fuji Electric Co., Ltd. Image sensor and method of making. 4,698,494, Cl. 250-211.00R.
Kato, Yoji: *See*—
Wada, Masaru; and Kato, Yoji, 4,698,122, Cl. 156-625.000.
Kato, Yoshiharu: *See*—
Kuze, Saburo; Kato, Yoshiharu; and Kojima, Shozo, 4,698,192, Cl. 264-101.000.

Katsuki, Hikaru: *See*—
Itani, Kiyoshi; Tokizaki, Hisashi; Funagoshi, Tomohide; Ohtsuka, Nobuo; Ohkubo, Katsuhiro; and Katsuki, Hikaru, 4,698,744, Cl. 364-140.000.

Katz, Joel D.: *See*—
Kim, Jonathan J.; and Katz, Joel D., 4,698,481, Cl. 219-121.0PY.

Kaufman, Meinolph: *See*—
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., 4,697,884, Cl. 350-334.000.

Kaufman, Richard A.: *See*—
Farrenkopf, Bruce C.; and Kaufman, Richard A., 4,698,315, Cl. 436-536.000.

Kaufmann, Henry C.: *See*—
Kellogg, Edwin M.; Dobbs, John M.; Dunn, Gregory J.; Kaufmann, Henry C.; and Thompson, William, 4,698,236, Cl. 427-43.100.

Kawada, Hideaki, to Sony Corporation. Tape cassette with lid locking and releasing mechanism. 4,698,713, Cl. 360-132.000.

Kawaguchi, Masato: *See*—
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.

Kawaguchi, Takeshi: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,697,825, Cl. 280-703.000.

Kawaguchi, Yasushi: *See*—
Mine, Kiyomitsu; Kobayashi, Yayoi; Kawaguchi, Yasushi; and Inokuma, Hiroyuki, 4,698,280, Cl. 428-425.900.

Kawai, Juichiro: *See*—
Takeuchi, Mamoru; Nemoto, Sadao; Suzuki, Shizuo; and Kawai, Juichiro, 4,697,984, Cl. 415-142.000.

Kawai, Masao: *See*—
Hayakawa, Yoichi; Kawai, Masao; Yoshizawa, Kenichi; Harada, Yoshiharu; and Fukumura, Kagenori, 4,697,479, Cl. 74-867.000.

Kawai Musical Instrument Mfg. Co., Ltd.: *See*—
Deutsch, Ralph, 4,697,490, Cl. 84-1.010.

Kawai, Tohru, to Canon Kabushiki Kaisha. Focal length variable lens apparatus. 4,697,891, Cl. 350-429.000.

Kawai, Yasuhiro: *See*—
Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, 4,697,902, Cl. 354-281.000.

Kawakami, Haruko: *See*—
Sekizawa, Hidekazu; Kawakami, Haruko; and Yamamoto, Naofumi, 4,698,669, Cl. 358-76.000.

Kawakami, James H.: *See*—
Robeson, Lloyd M.; Harris, James E.; Kawakami, James H.; and Maresca, Louis M., 4,698,390, Cl. 525-133.000.

Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, to Honda Giken Kogyo Kabushiki Kaisha. Front and rear wheel steering device. 4,697,816, Cl. 280-91.000.

Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, to Canon Kabushiki Kaisha. Motorized drive device for camera. 4,697,899, Cl. 354-173.110.

Kawamura, Reiki: *See*—
Hattori, Takemi; and Kawamura, Reiki, 4,697,848, Cl. 297-460.000.

Kawamura, Toshihide: *See*—
Sakai, Hirou; and Kawamura, Toshihide, 4,698,730, Cl. 362-311.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; Tamba, Shinichi; and Fukui, Noboru, 4,697,555, Cl. 123-90.230.
Tamba, Shinichi; and Ueki, Noriyuki, 4,697,557, Cl. 123-319.000.

Kawasaki, Katsuyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Front cover for small-sized vehicles. 4,697,842, Cl. 296-78.100.

Kawasaki, Keiichi: *See*—
Takahashi, Kazuhisa; Kawasaki, Keiichi; and Itoh, Yuji, 4,698,648, Cl. 346-108.000.

Kawasaki Steel Corporation: *See*—
Inokuti, Yukio; and Ito, Yo, 4,698,272, Cl. 428-627.000.
Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, 4,697,453, Cl. 73-290.00R.
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.

Kawato, Yutaka: *See*—
Hatano, Takashi; Nara, Takashi; Kawato, Yutaka; and Okada, Sumie, 4,698,801, Cl. 370-58.000.

Kayane, Yutaka; Sawamoto, Hirokazu; Omura, Takashi; and Harada, Naoki, to Sumitomo Chemical Company, Limited. Fiber-reactive disazo brown dye having vinylsulfone-type reactive group. 4,698,421, Cl. 534-642.000.

Kazami, Kazuyuki: *See*—
Wakabayashi, Hiroshi; Kazami, Kazuyuki; and Uchida, Isao, 4,697,898, Cl. 354-127.130.

Keane, James. Removal of chlorine-based contaminants from materials contaminated the same. 4,698,148, Cl. 208-390.000.

Keating, Richard. Hinged top grill arrangment. 4,697,504, Cl. 99-331.000.

Keem, John E.; and Marshall, Gerald F., to Energy Conversion Devices, Inc. Subassembly, method and system for monochromatizing X-rays. 4,698,833, Cl. 378-84.000.

Kehrer, Wolfgang, to Borsig GmbH. Device for cooling a reactor. 4,697,550, Cl. 122-34.000.

Keithly, David: *See*—
Dickerson, Clifford; and Keithly, David, 4,697,424, Cl. 60-670.000.

Keller, Arnold: *See*—
Link, Helmut D.; and Keller, Arnold, 4,698,063, Cl. 623-23.000.

Kellermann, Guenter: *See*—
Hertweck, Gernot; Kappis, Fritz; Kellermann, Guenter; and Schalueck, Klaus, 4,697,569, Cl. 123-568.000.

Kellogg, Edwin M.; Dobbs, John M.; Dunn, Gregory J.; Kaufmann, Henry C.; and Thompson, William, to Ion Beam Systems, Inc. Augmented carbonaceous substrate alteration. 4,698,236, Cl. 427-43.100.

Kellogg, Richard A.: *See*—
Seymour, Robert A.; Ritter, Allen M.; Kellogg, Richard A.; and D'Atre, John D., 4,698,577, Cl. 318-805.000.

Kelly, Joseph L., Jr.; Howard, Mig A.; Nysen, Paul A.; and Hacking, Colin A., to Hughes Tool Company. Surface acoustic wave pipe identification system. 4,698,631, Cl. 340-853.000.

Kennecott Corporation: *See*—
Kim, Jonathan J.; and Katz, Joel D., 4,698,481, Cl. 219-121.0PY.

Kennedy, Melvin R.; Nagel, Dietmar; and Arad, Abraham A. Articulated toy vehicle. 4,698,044, Cl. 446-434.000.

Kennedy, Paul G., to ITT Corporation. Eccentric plug valve. 4,697,786, Cl. 251-309.000.

Kenny Sr., Patrick M., to Ben-Jac, Inc. Embedment anchor. 4,697,958, Cl. 405-228.000.

Kentfield, John A. C.; and MacGregor, Ian, to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy & Natural Resources. Reinforced delta-wing blade for wind turbine. 4,697,988, Cl. 416-237.000.

Kerfoot, Charles S.: *See*—
Jones, Franklin B.; Milberger, Walter E.; Bulgher, David E.; and Kerfoot, Charles S., 4,698,742, Cl. 363-124.000.

Kernforschungszentrum Karlsruhe GmbH: *See*—
Ehrfeld, Wolfgang; Maner, Asim; and Munchmeyer, Dietrich, 4,698,285, Cl. 430-5.000.

Kerns, John A.; Stone, Roger R.; and Fabyan, Joseph, to United States of America, Energy. Magnetic shielding. 4,698,197, Cl. 376-142.000.

Kero, Ernst; and Gustafsson, Erik, to Plannja AB. Pallet and method of manufacturing the same. 4,697,529, Cl. 108-511.000.

Kerwawycz, John P.: *See*—
Link, Edward P.; and Kerwawycz, John P., 4,698,123, Cl. 156-634.000.

Kessler + Luch GmbH: *See*—
Detzer, Rudiger; Loew, Werner; and Kohnen, Franz, 4,697,435, Cl. 62-304.000.

Kessler, Sheldon; and Strubulis, Vasilios, to Pack-All, Inc. Apparatus with integral cutting mechanism for forming wrapped packages. 4,697,401, Cl. 53-459.000.

Kettell, Joseph: *See*—
Tsao, Utah; and Kettell, Joseph, 4,698,219, Cl. 423-563.000.

Kettlestrings, John S. Fabricated spar adapter sailing rig. 4,697,534, Cl. 114-90.000.

Key, Joe W.; and Shumaker, Fred E., to Key Ocean Services, Inc. Vessel mooring system and method for its installation. 4,698,038, Cl. 441-5.000.

Key Ocean Services, Inc.: *See*—
Key, Joe W.; and Shumaker, Fred E., 4,698,038, Cl. 441-5.000.

Keyes, Marion A., IV; and Shaffer, Jeremiah J., to Babcock & Wilcox Company, The. Adaptive gain compressor surge control system. 4,697,980, Cl. 415-1.000.

Kido, Tooru: *See*—
Tohya, Hirokazu; and Kido, Tooru, 4,698,517, Cl. 307-43.000.

Kido, Yukio: *See*—
Okuyama, Masayoshi; Kido, Yukio; Mimura, Isao; and Nakajima, Etsuro, 4,697,931, Cl. 368-223.000.

Kikuchi, Uhee; Nozaki, Hiroyoshi; Fukuda, Masao; and Satake, Toshihiko, to Honda Giken Kogyo Kabushiki Kaisha. Sealing apparatus. 4,698,005, Cl. 425-163.000.

Kilburn, Norman W.: *See*—
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., 4,697,721, Cl. 221-211.000.

Kilstofte, Richard B., to Fortel, Inc. Reversible drive mechanism for a magnetic tape in a magnetic tape recorder. 4,698,706, Cl. 360-96.400.

Kim, George A. Ultramicrotome tool. 4,697,489, Cl. 83-856.000.

Kim, Jonathan J.; and Katz, Joel D., to Kennecott Corporation. Method for preventing decomposition of silicon carbide articles during high temperature plasma furnace sintering. 4,698,481, Cl. 219-121.0PY.

Kimbell, John; and Uehlinger, Werner, to KM-Engineering AG. Transfer mechanisms for circular transfer press. 4,697,688, Cl. 198-339.100.

Kimberly-Clark Corporation: *See*—
Gallagher, Nicholas D.; Sternasty, Richard S.; and James, Richard A., 4,698,248, Cl. 428-41.000.
Rajala, Gregory J.; and Shavlik, Robert J., 4,697,693, Cl. 198-699.000.

Kimble, Jack, to BEI Electronics, Inc. Variable force linear actuator. 4,698,608, Cl. 335-222.000.

Kimura, Akinori: *See*—
Sato, Yoshimitsu; Ohtsuka, Shuichi; Kimura, Akinori; Yoda, Akira; Kato, Keishi; and Takahashi, Isoji, 4,697,912, Cl. 355-3.00R.

Kimura, Haruo: *See*—
Goto, Masao; Kimura, Haruo; Okada, Toshihiko; Yuasa, Katsunori; and Ito, Tetuzo, 4,697,708, Cl. 209-534.000.

Kimura, Kazuo; Tanimoto, Tetsuyuki; and Kobayashi, Hiroshi, to Minolta Camera Kabushiki Kaisha. Bi-level focusing plate of phase grating type. 4,697,878, Cl. 350-162.110.

Kimura, Shuichi, to Sony Corporation. Disk recording and/or reproducing apparatus with compensation for extraneous force during track jump. 4,698,796, Cl. 369-44.000.
Kimura, Yoshikazu; Sho, Ikuo; and Hatabe, Yukio. Apparatus for locating a carrier at a desired position. 4,698,569, Cl. 318-567.000.
Kindig, Alan L.; and Tew, Ho H., to General Electric Company. Connection insulator and stator assembly. 4,698,533, Cl. 310-71.000.
Kinetico, Inc.: *See*—
Ellis, George S., 4,698,164, Cl. 210-739.000.
King, Feather W.; and King, John R. Infant pacifier stabilizing device. 4,697,589, Cl. 128-359.000.
King, John R.: *See*—
King, Feather W.; and King, John R., 4,697,589, Cl. 128-359.000.
Kinghorn, John R.; and Bugg, Richard E. F., to U.S. Philips Corporation. Television receiver arrangements. 4,698,677, Cl. 358-147.000.
Kinnan, Frank R., to Utilitech, Incorporated. Portable apparatus for and method of pole reinforcement. 4,697,649, Cl. 175-19.000.
Kinnan, Frank R., to Utilitech, Incorporated. Method and apparatus for installing an in-ground support footing around an upstanding elongate object. 4,697,959, Cl. 405-232.000.
Kinoshita, Katsuyuki; and Suzuki, Yoshiji, to Hamamatsu Photonics Kabushiki Kaisha. Imaging and streaking tubes including a lid for covering an aperture in a wall separating the tube envelope into spaces during fabrication thereof. 4,698,544, Cl. 313-379.000.
Kinoshita, Keichi: *See*—
Takano, Yoshiaki; and Kinoshita, Keichi, 4,697,917, Cl. 355-14.00R.
Kinoshita, Kenichi: *See*—
Minami, Katsuhiro; Iwata, Hitoshi; and Kinoshita, Kenichi, 4,698,552, Cl. 315-82.000.
Kinsey, Joe L., Jr.: *See*—
Gibbons, Charles E.; Whillock, Allan A.; Lanham, Robert L.; and Kinsey, Joe L., Jr., 4,698,246, Cl. 428-35.000.
Kirby, Robert A., to Exxon Production Research Company. Debris ejector for a seismic vibrator. 4,697,667, Cl. 181-113.000.
Kirin Beer Kabushiki Kaisha: *See*—
Nakanishi, Koichi; Onaka, Toshio; and Inoue, Takashi, 4,698,224, Cl. 426-11.000.
Kirschner, Kraig A., to Automatic Fire Control, Inc. Sway brace for piping. 4,697,770, Cl. 248-62.000.
Kishimoto, Shinichi: *See*—
Hyodo, Hiroshi; Yamada, Naoki; Iwase, Kenichi; and Kishimoto, Shinichi, 4,697,925, Cl. 356-339.000.
Kishimoto, Yoshio, to Matsushita Electric Industrial Co., Ltd. Flexible thermosensitive wire. 4,698,488, Cl. 219-549.000.
Kitagawa Industries Co., Ltd.: *See*—
Matsui, Kazuhiro; Tanigawa, Mitsuru; and Sugiura, Haruyuki, 4,697,303, Cl. 16-112.000.
Kitamura, Makoto; and Yamaguchi, Kiyoshi, to Tokico Ltd. Suspension device. 4,697,796, Cl. 267-35.000.
Kitamura, Masaharu; and Hirono, Akira, to Kuroi Glass Industry Co., Ltd. Decorator lamp. 4,698,735, Cl. 362-230.000.
Kitamura, Rou: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.
Kitani, Shigehisa: *See*—
Ochi, Hiroshi; Tetsutani, Nobuji; Yamamoto, Tetsuji; Kitani, Shigehisa; and Watanabe, Asao, 4,698,688, Cl. 358-257.000.
Kitaura, Yoshihiko; Oku, Teruo; Hirai, Hideo; Yamamoto, Tosiyuki; and Hashimoto, Masashi, to Fujisawa Pharmaceutical Co., Ltd. Quinolizinone compounds, and pharmaceutical composition comprising the same, useful as anti-ulcerative and anti-allergic agents. 4,698,349, Cl. 514-306.000.
Kitayama, Isao: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.
Kitchen, John A., to John A. Kitchen Ltd. Pulse combustion apparatus. 4,697,358, Cl. 34-191.000.
Kiuchi, Masayoshi: *See*—
Eguchi, Masaharu; and Kiuchi, Masayoshi, 4,697,900, Cl. 354-215.000.
Kiyama, Masao: *See*—
Nagai, Norimichi; Horiishi, Nanao; Kiyama, Masao; and Takada, Toshio, 4,698,182, Cl. 252-62.590.
Kizior, David J.: *See*—
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.
Kjolseth, Ove: *See*—
Willners, Harry; and Kjolseth, Ove, 4,698,824, Cl. 373-49.000.
Klabunde, Ulrich, to Du Pont de Nemours, E. I., and Company. Nickel-catalyzed copolymerization of ethylene. 4,698,403, Cl. 526-126.000.
Klee, Gerhard; Gerk, Wilfried; and Jeschke, Norbert. Rotating drilling head. 4,697,484, Cl. 82-1.500.
Klein, Dieter H.; and Koenig, Raymond, to Dow Chemical Company, The. Polyfunctional phenolic reaction product, a process for its preparation and it use. 4,698,401, Cl. 525-489.000.
Klein, Gunter, deceased: *See*—
Rohde, Wilhelm; and Klein, Gunter, deceased, 4,698,073, Cl. 55-33.000.
Klein, Norbert; Parisch, Jochen; and Zweigart, Gerhard, to Daimler-Benz Aktiengesellschaft. Adhesive connection arrangement for a windshield held on a body of a motor vehicle. 4,697,841, Cl. 296-84.00R.
Klein, Norbert: *See*—
Hilger, Manfred; and Klein, Norbert, 4,698,292, Cl. 430-273.000.
Klein, Robert W., to Grumman Aerospace Corporation. Flight control system employing complementary filter. 4,697,768, Cl. 244-191.000.
Kleineberg, Wolfgang; and Scheurenbrand, Dieter, to Daimler-Benz Aktiengesellschaft. Valve arrangement for the ventilation and the venting of fuel tanks for motor vehicles. 4,697,612, Cl. 137-39.000.
Kleinschroth, Jurgen: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, 4,698,341, Cl. 514-230.000.
Klenke, Daniel J.: *See*—
Chen, Wen-hsiung; and Klenke, Daniel J., 4,698,672, Cl. 358-136.000.
Kline, Leonard J., Jr.: *See*—
Smith, Francis E.; Hyatt, Robert L.; and Kline, Leonard J., Jr., 4,698,534, Cl. 310-89.000.
Klingel, Hans, to Trumpf GmbH & Co. Computer controlled machine for punching and thermal cutting of workpieces. 4,698,480, Cl. 219-121.0LG.
Klink, Rainer: *See*—
Henkel, Eberhard; Dolabdjian, Barkew; Helger, Roland; Klink, Rainer; and Wurzburg, Uwe, 4,698,300, Cl. 435-18.000.
Klobucar, W. Dirk: *See*—
Kolich, Charles H.; and Klobucar, W. Dirk, 4,698,439, Cl. 558-80.000.
KM-Engineering AG: *See*—
Kimbell, John; and Uehlinger, Werner, 4,697,688, Cl. 198-339.100.
Knapp, Alan G.; and Lamport, Daphne L., to U.S. Philips Corporation. Cathode ray tube display system. 4,698,555, Cl. 315-366.000.
Knecht, Klaus; and Kraus, Kurt, to Kraftwerk Union Aktiengesellschaft. Method and device for repairing fuel assemblies of boiling-water nuclear reactors. 4,697,322, Cl. 29-402.030.
Knight, John K., to R.F.D. Consultants Pty. Ltd. Utility pole support. 4,697,396, Cl. 52-170.000.
Knight, Orien M., to Gearhart Industries, Inc. Downhole logging and servicing system with manipulatable logging and servicing tools. 4,697,638, Cl. 166-65.100.
Knights, John C.: *See*—
Barker, Robert A.; Tsai, Chuang C.; and Knights, John C., 4,698,104, Cl. 437-141.000.
Knofel, Hartmut: *See*—
Engbert, Theodor; Knofel, Hartmut; and Wegener, Gerhard, 4,698,424, Cl. 544-222.000.
Knoop, Donald E., to Whirlpool Corporation. Pressure sensing automatic water level control. 4,697,293, Cl. 8-158.000.
Knowles, William T., Jr., to Shell Western E&P Inc. Choke cooling waxy oil. 4,697,426, Cl. 62-48.000.
Kobayashi, Hiroshi: *See*—
Kimura, Kazuo; Tanimoto, Tetsuyuki; and Kobayashi, Hiroshi, 4,697,878, Cl. 350-162.110.
Kobayashi, Kazunari: *See*—
Takamura, Koji; Hosoya, Takamasa; and Kobayashi, Kazunari, 4,697,894, Cl. 350-574.000.
Kobayashi, Masanori: *See*—
Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mouri, Yasushi; and Kobayashi, Masanori, 4,697,987, Cl. 416-204.00A.
Kobayashi, Masayasu; and Eno, Julius R., Jr., to Hamamatsu Photonics Kabushiki Kaisha. Hollow cathode lamp. 4,698,550, Cl. 313-618.000.
Kobayashi, Mikio: *See*—
Inoue, Senya; Ono, Akira; Kobayashi, Mikio; and Yokoo, Hiroshi, 4,698,317, Cl. 501-9.000.
Kobayashi, Mitaka: *See*—
Nakaya, Keiichi; Tanaka, Kunio; Kanno, Fukuo; and Kobayashi, Mitaka, 4,698,379, Cl. 523-513.000.
Kobayashi, Ryuichi: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,697,899, Cl. 354-173.110.
Kobayashi, Tadashi; and Nozaki, Shinya, to Diesel Kiki Co., Ltd. Distributor-type fuel injection pump. 4,697,565, Cl. 123-449.000.
Kobayashi, Takashi; and Maruyama, Yuji, to West Electric Company, Ltd. Electric flash device. 4,697,906, Cl. 354-416.000.
Kobayashi, Tetsuhiko: *See*—
Haruta, Masatake; Sano, Hiroshi; and Kobayashi, Tetsuhiko, 4,698,324, Cl. 502-243.000.
Kobayashi, Toshio, to Nissan Motor Co., Ltd. Windshield wiper. 4,697,297, Cl. 15-250.230.
Kobayashi, Yayoi: *See*—
Mine, Kiyomitsu; Kobayashi, Yayoi; Kawaguchi, Yasushi; and Inokuma, Hiroyuki, 4,698,280, Cl. 428-425.900.
Koch, G. Teryl; Smith, Thomas L.; Jacklin, Keith A.; and Hammond, James A., to Colamco, Inc. Composite foam articles and method for fabricating such articles. 4,698,252, Cl. 428-159.000.
Koch, George R.; Krolak, Michael; and Biche, Michael R., to Flexible Manufacturing Systems, Inc. Self-contained mobile reprogrammable automation device. 4,698,775, Cl. 364-478.000.
Koch, Hannsjorg: *See*—
Rohde, Wilhelm; Koch, Hannsjorg; and Metschl, Michael, 4,698,072, Cl. 55-31.000.
Koch, Walther: *See*—
Riesner, Gerhard; and Koch, Walther, 4,698,729, Cl. 361-386.000.
Kociolek, Kenneth W.: *See*—
Kadlec, Joseph; and Kociolek, Kenneth W., 4,698,681, Cl. 358-168.000.

Koda, Takao; Ichii, Hirokazu; and Komatuzaki, Hiroshi, to Fuji Photo Film Co., Ltd. Camera back lid opening apparatus. 4,697,903, Cl. 354-288.000.

Koehler, Randal W., to Eaton Corporation. Temperature limiting control. 4,698,612, Cl. 337-320.000.

Koenig, Raymond: *See—*
Klein, Dieter H.; and Koenig, Raymond, 4,698,401, Cl. 525-489.000.

Koeniger, Martin, to Hermann Koeniger, Firma. Device for growing plants at an abnormal growth rate in a container. 4,697,382, Cl. 47-66.000.

Kofink, Wolfgang: *See—*
Andrei-Alexandru, Marcel; Kofink, Wolfgang; Schmid, Eckhardt; and Tietz, Volker, 4,698,560, Cl. 318-54.000.

Kofler, Wilhelm, to Benninger AG. Winding machine for winding and/or unwinding web-like guided materials. 4,697,756, Cl. 242-67.10R.

Kogane, Mikio, to Fuji Photo Film Co., Ltd. Photographic paper accommodating apparatus. 4,697,918, Cl. 355-27.000.

Kohata, Toshihide; Miyazaki, Masaru; Sato, Yoshihisa; and Ikeda, Junichi, to Japan Tobacco, Inc. Apparatus for controlling amount of delivery in wrapping material feed system. 4,697,408, Cl. 57-264.000.

Kohayamawa, Yoshimi: *See—*
Sekiguchi, Kyoji; and Kohayamawa, Yoshimi, 4,697,895, Cl. 351-243.000.

Kohler Coating Machinery Corporation, The: *See—*
Kohler, Herbert B.; and Kohler, John B., 4,697,542, Cl. 118-63.000.

Kohler, Herbert B.; and Kohler, John B., to Kohler Coating Machinery Corporation, The. Adjustable nozzle for coating equipment. 4,697,542, Cl. 118-63.000.

Kohler, John B.: *See—*
Kohler, Herbert B.; and Kohler, John B., 4,697,542, Cl. 118-63.000.

Kohn, Erhard, to Thomson-CSF. Field effect transistor with a submicron vertical structure and its production process. 4,698,654, Cl. 357-22.000.

Kohnen, Franz: *See—*
Detzer, Rudiger; Loew, Werner; and Kohnen, Franz, 4,697,435, Cl. 62-304.000.

Kohyama, Mikihiro, to Honda Giken Kogyo Kabushiki Kaisha. Scooter type motorcycle. 4,697,664, Cl. 180-226.000.

Koibuchi, Shigeru; Isobe, Asao; and Makino, Daisuke, to Hitachi Chemical Co., Ltd.; and Hitachi, Ltd. Photosensitive composition with 4-azido-2'-methoxychalcone. 4,698,291, Cl. 430-196.000.

Koikeda, Minoru: *See—*
Imai, Tetsuya; Fujita, Hiroshi; Koikeda, Minoru; and Suzuki, Takashi, 4,698,449, Cl. 585-469.000.

Koivurinta, Juha A., to Suomen Sokeri Oy (Finnish Sugar Company Ltd.). Binder-diluent composition and method. 4,698,101, Cl. 127-30.000.

Koizumi, Satoru; Teshima, Daisuke; and Katayama, Yoshio, to Sharp Kabushiki Kaisha. Automatic cassette tape recorder stop mechanism. 4,698,704, Cl. 360-74.100.

Kojima, Hiroshi: *See—*
Nakagima, Masashi; Kojima, Hiroshi; Matsui, Tatsuro; and Dokoshi, Noriaki, 4,698,407, Cl. 528-14.000.

Kojima, Shozo: *See—*
Kuze, Saburo; Kato, Yoshiharu; and Kojima, Shozo, 4,698,192, Cl. 264-101.000.

Kokko, Kent S.; and Mattison, Phillip L., to Henkel Corporation. Alkylated 8-hydroxyquinoline derivatives via a diels-alder cycloaddition to 5,7-diallyl or 7-allyl substituents thereon. 4,698,429, Cl. 546-179.000.

Kokubu, Tatsuo: *See—*
Matsueda, Rei; Yabe, Yuichiro; Yamazaki, Mitsuo; Kokubu, Tatsuo; and Hiwada, Kunio, 4,698,329, Cl. 514-18.000.

Kolev, Nikola T., to Naucho Proizvodsvena Laboratoria za Dvigateli s Vatreshno Gorene. Modular internal combustion engine. 4,697,552, Cl. 123-56.0BC.

Kolich, Charles H.; and Klobucar, W. Dirk, to Ethyl Corporation. Mixed esters of polyphosphazenes. 4,698,439, Cl. 558-80.000.

Kollmeier, Hans-Joachim: *See—*
Huttinger, Rudolf; Kollmeier, Hans-Joachim; Langenhagen, Rolf-Dieter; Walter, Alfred; and Wolfes, Wilhelm, 4,698,178, Cl. 252-309.000.

Kollmorgen Technologies Corporation: *See—*
Byrne, John V.; and O'Dwyer, Jeremiah B., 4,698,537, Cl. 310-168.000.

Kolpak Industries, Inc.: *See—*
Chandler, Michael S.; and Fiddler, R. Charles, 4,697,429, Cl. 62-203.000.

Kolt, Stanley, to Suroff, Leonard W., a part interest. Automatic damper assembly. 4,697,736, Cl. 236-49.000.

Kolze, Lawrence A.; Pick, James M.; and Swanson, Wesley S., to Eaton Corporation. Electromagnetic valve assembly. 4,697,608, Cl. 137-1.000.

Komatsu, Hirotake, to Nippon Gakki Seizo Kabushiki Kaisha. Optical type information reproducing device. 4,698,797, Cl. 369-116.000.

Komatsubara, Hirofumi: *See—*
Nonomura, Yutaka; Sugiyama, Jun; Komatsubara, Hirofumi; and Takeuchi, Masaharu, 4,697,459, Cl. 73-862.360.
Sugiyama, Jun; Komatsubara, Hirofumi; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,697,460, Cl. 73-862.360.

Komatuzaki, Hiroshi: *See—*
Koda, Takao; Ichii, Hirokazu; and Komatuzaki, Hiroshi, 4,697,903, Cl. 354-288.000.

Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, to Canon Kabushiki Kaisha. Image forming apparatus. 4,697,916, Cl. 355-14.00E.

Komuro, Matahiro; Kozono, Yuzo; Yasuda, Takeshi; Narishige, Shinji; Hanazono, Masanobu; and Kuroda, Tetsuro, to Hitachi, Ltd. Multilayered ferromagnetic film and method of manufacturing the same. 4,698,273, Cl. 428-635.000.

Kondo, Shiro: *See—*
Mizuta, Ken; and Kondo, Shiro, 4,698,571, Cl. 318-568.000.

Konishi, Yoshinori: *See—*
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
Horiuchi, Tatumi, 4,697,806, Cl. 271-288.000.
Mine, Kiyomitsu; Kobayashi, Yayoi; Kawaguchi, Yasushi; and Inokuma, Hiroyuki, 4,698,280, Cl. 428-425.900.

Kook, John F.: *See—*
Blaisdell, Charles T.; Cordes, Walter J.; Heinsohn, George E.; Kook, John F.; and Kosak, John R., 4,698,438, Cl. 558-3.000.

Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., to Du Pont de Nemours, E. I., and Company. Coating composition of a hydroxy functional epoxy polyester graft copolymer. 4,698,398, Cl. 525-437.000.

Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., to Du Pont de Nemours, E. I., and Company. Chip resistant primer composition I'. 4,698,399, Cl. 525-449.000.

Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., to Du Pont de Nemours, E. I., and Company. Chip resistant primer composition III. 4,698,400, Cl. 525-450.000.

Kordomenos, Panagiotis I.; Dervan, Andrew H.; and Grebur, Dennis J., to Du Pont de Nemours, E. I., and Company. Chip resistant primer composition IV. 4,698,402, Cl. 525-533.000.

Koroscil, Anthony, to American Cyanamid Company. High light output-short duration chemiluminescent compositions. 4,698,183, Cl. 252-700.000.

Kosak, John R.: *See—*
Blaisdell, Charles T.; Cordes, Walter J.; Heinsohn, George E.; Kook, John F.; and Kosak, John R., 4,698,438, Cl. 558-3.000.

Kosaka, Minoru; and Banno, Tutomu, to Pioneer Electronic Corporation. Recording disk data playback apparatus. 4,698,695, Cl. 358-338.000.

Koshino, Minoru; and Matsumoto, Yasuo, to Fujitsu Limited. Error detection of scan-out in a diagnostic circuit of a computer. 4,698,754, Cl. 364-200.000.

Kostylev, Alexandr D.; Plavskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., to Institut Gornogo Dela Sibirskogo Otdelenia Akademii Nauk SSSR. Reversible percussive action machine. 4,697,647, Cl. 173-91.000.

Kosugi, Yoshinobu; and Tachibana, Kaoru, to Slik Tripod Co., Ltd. Universal head for a tripod. 4,697,772, Cl. 248-183.000.

Kotaka, Hirofumi: *See—*
Ishizawa, Tadao; Kotaka, Hirofumi; and Kakinuma, Masami, 4,697,994, Cl. 418-8.000.

Kouji, Hiroyuki: *See—*
Hayashi, Yoshiharu; and Kouji, Hiroyuki, 4,698,094, Cl. 71-108.000.

Koyama, Katsuhide: *See—*
Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, 4,697,902, Cl. 354-281.000.

Kozakae, Kunitoshi: *See—*
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, 4,697,469, Cl. 74-117.000.

Koziol, Konrad: *See—*
Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, 4,698,825, Cl. 373-93.000.

Kozono, Yuzo: *See—*
Komuro, Matahiro; Kozono, Yuzo; Yasuda, Takeshi; Narishige, Shinji; Hanazono, Masanobu; and Kuroda, Tetsuro, 4,698,273, Cl. 428-635.000.

Kraftwerk Union Aktiengesellschaft: *See—*
Gugel, Siegfried; Pellkofer, Dieter; and Forner, Siegfried, 4,698,474, Cl. 219-60.00A.
Knecht, Klaus; and Kraus, Kurt, 4,697,322, Cl. 29-402.030.
Schiffers, Ulrich, 4,697,415, Cl. 60-39.120.

Krase, Horst: *See—*
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., 4,698,396, Cl. 525-420.500.

Kraus, Kurt: *See—*
Knecht, Klaus; and Kraus, Kurt, 4,697,322, Cl. 29-402.030.

Krauter, Allan I., to Welch Allyn, Inc. Endoscope forceps elevator cable seal. 4,697,576, Cl. 128-4.000.

Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., to Tektronix, Inc. Touch panel system. 4,698,460, Cl. 178-19.000.

Krein, Philip T.: *See—*
Meadows, Robert D.; Krein, Philip T.; and Murdock, Bruce, 4,698,461, Cl. 178-19.000.

Kretschmer, Frank F., to United States of America, Navy. Generalized polyphase code pulse compressor. 4,698,827, Cl. 375-86.000.

Kreuder, Hans-Joachim: *See—*
Meyer, Rolf-Volker; Kreuder, Hans-Joachim; and Hohl, Erwin, 4,698,426, Cl. 544-253.000.

Krohn, David A.; Maack, David R.; Vinarub, Edmond I.; and Ellison, John R., Jr., to Eotec Corp. Optoelectronic rotational position sensor. 4,698,616, Cl. 340-347.00P.

Krolak, Michael: *See*—
Koch, George R.; Krolak, Michael; and Biche, Michael R., 4,698,775, Cl. 364-478.000.

Kron, Karl L. E., to Telefonaktiebolaget L M Ericsson. Transient protection unit. 4,698,722, Cl. 361-111.000.

Kroy Inc.: *See*—
Bradshaw, Franklin C.; and Maloney, Patrick M., 4,697,940, Cl. 400-134.600.

Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, to President & Fellows of Harvard College. Somnogenic compositions and method of use. 4,698,330, Cl. 514-19.000.

Kruger, Volker; and Hense, Ulrich, to Eastman Christensen. Device for remote transmission of information. 4,698,794, Cl. 367-83.000.

Krulik, Gerald, to Morton Thiokol, Inc. Method of regenerating permanganate etch bath. 4,698,124, Cl. 156-642.000.

KTA-Tator, Inc.: *See*—
Tator, Kenneth B.; and Lackey, Richard O., 4,698,507, Cl. 250-429.000.

Kubota, Akihiro; Aoki, Tsuyoshi; Ono, Michio; and Sugiura, Rikio, to Fujitsu Limited. Resin-molded semiconductor device. 4,698,660, Cl. 357-70.000.

Kubota, Masaharu: *See*—
Ohgami, Masaaki; Yasuda, Hiroki; and Kubota, Masaharu, 4,697,564, Cl. 123-440.000.

Kubota, Masayoshi: *See*—
Matsuzaki, Harumi; Kubota, Masayoshi; Ebara, Katsuya; Takahashi, Sankichi; and Kuroiwa, Minoru, 4,698,153, Cl. 210-192.000.

Kubota, Tatsuya; and Takanashi, Kenji, to Sony Corporation. Video signal control circuit. 4,698,676, Cl. 358-140.000.

Kubozoe, Morioki: *See*—
Nomura, Setsuo; Kubozoe, Morioki; and Isakozawa, Shigeto, 4,698,503, Cl. 250-311.000.

Kudlicka, Mark L.: *See*—
Cranston, Albert E., III; and Kudlicka, Mark L., 4,697,510, Cl. 100-14.000.

Kudo, Osamu: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.

Kugo, Masaru: *See*—
Ito, Hiroshi; Kugo, Masaru; and Watanate, Sizuhisa, 4,697,886, Cl. 350-336.000.

Kulman, James: *See*—
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi C.; Fournier, Jeffrey; and Kulman, James, 4,698,234, Cl. 427-39.000.

Kumagai, Takenori: *See*—
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.

Kumnick, Albert J.: *See*—
Grant, William F.; Burt, Gary W.; and Kumnick, Albert J., 4,697,324, Cl. 29-419.00R.

Kumokawa, Takashi: *See*—
Imamura, Eiji; Kumokawa, Takashi; Nakayama, Fumio; Mandai, Haruhumi; Fukutani, Iwao; and Tomono, Kunisaburo, 4,698,605, Cl. 333-184.000.

Kuno, Atsushi: *See*—
Takaya, Takao; Takasugi, Hisashi; Kuno, Atsushi; and Sugiyama, Yoshie, 4,698,340, Cl. 514-222.000.

Kuno, Shozo, to Aisin Seiki Kabushiki Kaisha. Clutch cover. 4,697,678, Cl. 192-70.280.

Kuno, Yasuo: *See*—
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.

Kuo, Charles C. Y., to CTS Corporation. Base metal resistor. 4,698,265, Cl. 428-432.000.

Kupper, Wilhelm; and Hensen, Helmuth, to W. Schlafhorst & Co. Device for advancing cops to a cyclically stepwise advancing cop conveyor. 4,697,692, Cl. 198-464.300.

Kuramoto, Yukimasa; Oonishi, Hajimu; Sakai, Yukio; Hayashi, Yoshiki; and Wells, Robert C., to Matsushita Electric Industrial Co., Ltd. Copying apparatus for synthesizing images. 4,697,913, Cl. 355-3.00R.

Kurimoto, Kiyoshi: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.

Kurkjian, Andrew L.; and Chang, Shu-Kong, to Schlumberger Technology Corporation. Method and apparatus for acoustic dipole shear wave well logging. 4,698,792, Cl. 367-31.000.

Kuroda, Kohji: *See*—
Minowa, Toshio; Hashimoto, Tetsuro; Kuroda, Kohji; and Nakayama, Kazutaka, 4,697,885, Cl. 350-334.000.

Kuroda, Tetsuro: *See*—
Komuro, Matahiro; Kozono, Yuzo; Yasuda, Takeshi; Narishige, Shinji; Hanazono, Masanobu; and Kuroda, Tetsuro, 4,698,273, Cl. 428-635.000.

Kuroi Glass Industry Co., Ltd.: *See*—
Kitamura, Masaharu; and Hirono, Akira, 4,698,735, Cl. 362-230.000.

Kuroiwa, Minoru: *See*—
Matsuzaki, Harumi; Kubota, Masayoshi; Ebara, Katsuya; Takahashi, Sankichi; and Kuroiwa, Minoru, 4,698,153, Cl. 210-192.000.

Kurosawa, Ryoichi: *See*—
Shimamura, Takeo; Uchino, Hiroshi; and Kurosawa, Ryoichi, 4,698,581, Cl. 323-211.000.

Kus, Helmut: *See*—
Jaumann, Leonhard; and Kus, Helmut, 4,697,773, Cl. 248-162.100.

Kuusi, Juhani, to Robotest Oy. Procedure and means for measuring with the aid of a radio-isotope source the distribution of fillers in a web. 4,698,832, Cl. 378-46.000.

Kuze, Saburo; Kato, Yoshiharu; and Kojima, Shozo, to Murata Manufacturing Co., Ltd. Apparatus for manufacturing a laminated unit of ceramic green sheets. 4,698,192, Cl. 264-101.000.

Kyocera Corporation: *See*—
Nishiguchi, Yasuo; Yasutomi, Tsuyoshi; and Shiraishi, Ryoichi, 4,698,643, Cl. 346-76.0PH.

Kyoden, Tatsuo: *See*—
Tanaka, Morimasa; and Kyoden, Tatsuo, 4,698,463, Cl. 200-5.00R.

L. & C. Steinmuller GmbH: *See*—
Grethe, Klaus; Eickhoff, Heinrich; Goller, Elmar; and Hulsen, Ralf, 4,698,014, Cl. 431-9.000.

Laan, Dirk, to Stichting IWL. Method for the manufacture of insulating porous shaped building articles. 4,698,366, Cl. 521-55.000.

Labofina, S.A.: *See*—
De Boodt, Marcel F. L. P.; De Strooper, Eric B. A.; and Van Meirvenne, Marc R., 4,697,961, Cl. 405-264.000.

LaBounty, Roy E. Auto body crushing device. 4,697,509, Cl. 100-233.000.

Lackey, Richard O.: *See*—
Tator, Kenneth B.; and Lackey, Richard O., 4,698,507, Cl. 250-429.000.

Lai, John T.; and Son, Pyong N., to BF Goodrich Company, The. Synthesis of polyamines and mixture formed thereby, of diprimary polyalkylene polyamines with disubstituted N-adjacent terminal carbon atom(s). 4,698,446, Cl. 564-494.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Belot, Dominique; Rade, Jean-Yves; Piffard, Jean-Francois; Larquet, Christian; and Cornut, Philippe, 4,698,218, Cl. 423-347.000.

Laitar, Robert A., to Acme Resin Corporation. Binder compositions containing phenolic resins and esters of alkoxy acids. 4,698,377, Cl. 523-143.000.

Lak, Khosrow: *See*—
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.

Lake, David E., Jr.; and Miller, Robert L., to Grass Valley Group, Inc., The. Video key glow and border generator. 4,698,666, Cl. 358-22.000.

Lamalle, Jean; and Tijne, Jean-Louis, to Aerospatiale Societe Nationale Industrielle. Manufacture of a hollow envelope by winding filamentary material. 4,698,011, Cl. 425-389.000.

Lamensdorf, David; Robbins, Kenneth W.; and Ross, Gerald F., to Sperry Corporation. Antennas for wide bandwidth signals. 4,698,633, Cl. 342-42.000.

Lamport, Daphne L.: *See*—
Knapp, Alan G.; and Lamport, Daphne L., 4,698,555, Cl. 315-366.000.

Lanfranconi, Gianmario: *See*—
Marin, Carlo; Lanfranconi, Gianmario; and Borroni, Andrea, 4,698,009, Cl. 425-196.000.
Parmigiani, Bruno; and Lanfranconi, Gianmario, 4,698,458, Cl. 174-73.00R.

Lang, Michael: *See*—
Mahoney, Thomas J.; and Lang, Michael, 4,698,498, Cl. 250-234.000.

Lange, Jurgen, to VDO Adolf Schindling AG. Electrically actuatable fuel-injection valve for internal combustion engines. 4,697,738, Cl. 239-102.200.

Langenhagen, Rolf-Dieter: *See*—
Huttinger, Rudolf; Kollmeier, Hans-Joachim; Langenhagen, Rolf-Dieter; Walter, Alfred; and Wolfes, Wilhelm, 4,698,178, Cl. 252-309.000.

Lanham, Robert L.: *See*—
Gibbons, Charles E.; Whillock, Allan A.; Lanham, Robert L.; and Kinsey, Joe L., Jr., 4,698,246, Cl. 428-35.000.

Lantzsch, Reinhard: *See*—
Fauss, Rudolf; Lantzsch, Reinhard; Findeisen, Kurt; Jager, Gerhard; Hammann, Ingeborg; Becker, Benedikt; and Homeyer, Bernhard, 4,698,333, Cl. 514-63.000.

Larquet, Christian: *See*—
Belot, Dominique; Rade, Jean-Yves; Piffard, Jean-Francois; Larquet, Christian; and Cornut, Philippe, 4,698,218, Cl. 423-347.000.

Lars-Inge Larsson med Firma Larssons Industrimekaniska Verkstad: *See*—
Larsson, Lars-Inge, 4,697,388, Cl. 51-120.000.

Larsen, Hals N.; and Stephens, Donald L., to Paccar Inc. Quick-response control system for low-flow engine coolant systems. 4,697,551, Cl. 123-41.310.

Larsen, James W.; and Campbell, Daniel P., to Sangamo Weston, Inc. Structure for Hall device for compensation of first and second order voltage offsets. 4,698,522, Cl. 307-309.000.

Larsen, Theodore E., to Intech-Systems, Inc. Method of selecting and reproducing language characters. 4,698,758, Cl. 364-419.000.

Larson, Paul F.; Douglas, Roy D.; Petrofsky, Jerrold S.; and Phillips, Chandler A., to Wright State University. Walking assistance system. 4,697,808, Cl. 272-70.000.

Larsson, Lars-Inge, to Lars-Inge Larsson med Firma Larssons Industrimekaniska Verkstad. Arrangement for grinding planar annular surfaces. 4,697,388, Cl. 51-120.000.

Laser Corporation of America: *See*—
Hoag, Ethan D., 4,698,551, Cl. 313-619.000.

Lassiaz, Philippe: *See*—
Gay, Christian; and Lassiaz, Philippe, 4,697,681, Cl. 192-98.000.

Latourrette, Bertrand: *See*—
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,698,175, Cl. 252-182.000.

Lau, Nam S.; and Lau, Yick J., to Phantom Firework Manufacturing Company Limited. Molded fireworks. 4,697,518, Cl. 102-358.000.

Lau, Tit-Kueng; and Cohen, Abraham B., to Du Pont de Nemours, E. I., and Company. Lamination of photopolymerizable film onto a substrate employing an intermediate nonphotosensitive liquid layer. 4,698,294, Cl. 430-325.000.

Lau, Yick J.: *See*—
Lau, Nam S.; and Lau, Yick J., 4,697,518, Cl. 102-358.000.

Laukien, Gunther R.: *See*—
Zeiger, Heinz; and Laukien, Gunther R., 4,698,594, Cl. 324-309.000.

Laumeister, William: *See*—
Nichols, William E.; Herzog, William F.; Feldman, Neil; and Laumeister, William, 4,698,664, Cl. 358-10.000.

Lauterbach, George E.: *See*—
Tye, Richard J.; Lauterbach, George E.; and Standel, Philip R., 4,698,172, Cl. 252-70.000.

Lauterbach, Inge: *See*—
Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, 4,698,825, Cl. 373-93.000.

LaValley Industrial Plastics, Inc.: *See*—
LaValley, Richard W., 4,697,292, Cl. 8-156.000.

LaValley, Richard W., to LaValley Industrial Plastics, Inc. Shower pipes for rotary drum filter. 4,697,292, Cl. 8-156.000.

Lay, Manchiu D., to Stauffer Chemical Company. Production of an aqueous phosphoric acid solution. 4,698,216, Cl. 423-317.000.

Lazar, Stanley, to Cantar Corporation. Method of making floatable sheet material. 4,698,109, Cl. 156-145.000.

Lazaro, Eric J.: *See*—
Spillert, Charles R.; Devereux, Corinne; and Lazaro, Eric J., 4,698,335, Cl. 514-158.000.

Lazzari, Jean-Pierre, to Commissariat a l'Energie Atomique. Device for magnetically reading and writing on a flying support. 4,698,708, Cl. 360-103.000.

Lazzari, Jean-Pierre, to Commissariat a l'Energie Atomique. Support for magnetic recording disk and its production process. 4,698,716, Cl. 360-135.000.

LeBail, Stanley G.: *See*—
Narusch, Michael J., Jr.; and LeBail, Stanley G., 4,698,269, Cl. 428-552.000.

Le Berre, Serge: *See*—
Boulitrop, Francois; Chartier, Eric; Mourey, Bruno; and Le Berre, Serge, 4,697,331, Cl. 437-82.000.

Le Bret, Lucien F.; and Saada, Robert, to Gallay S.A. Method for seaming end closures to a container body. 4,697,972, Cl. 413-6.000.

Lecher, Theodore R., to Perlick Company, Inc., The. Bottle trough security device. 4,697,855, Cl. 312-290.000.

Le Clerco, Pierre A. L. M. G.; Delheusy, Jean C.; and Rigot, Guy J. Method of constructing reinforced concrete works such as underground galleries, road tunnels, et cetera; pre-fabricated contrete elements for constructing such works. 4,697,955, Cl. 405-135.000.

Le Coent, Jean-Louis, to Rhone-Poulenc Recherches. Process for the preparation of very highly alkaline, calcium-based detergent-dispersant additives and products produced therefrom. 4,698,170, Cl. 252-33.200.

Lederer, Edgar: *See*—
Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, 4,698,330, Cl. 514-19.000.

Lee, Francis C.: *See*—
Drago, Gary A.; Baier, Walter F.; Lee, Francis C.; Mills, Ross N.; and Mossbrugger, Horst G., 4,698,644, Cl. 346-140.00R.

Lee, Jerald D., to Du Pont de Nemours, E. I., and Company. Apparatus for controlling the velocity of a member in a digital printing system. 4,698,649, Cl. 346-108.000.

Lee, Len F.; and Miller, Maria L., to Monsanto Company. Herbicidal (2 or 6)-fluoroalkyl-4-amino pyridine derivatives. 4,698,093, Cl. 71-94.000.

Lee, Rule. Multi-function measuring apparatus. 4,697,349, Cl. 33-27.030.

Lefrancier, Pierre: *See*—
Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, 4,698,330, Cl. 514-19.000.

Legrand: *See*—
Sarton, Francois; and Roby, Gerard, 4,697,774, Cl. 248-221.400.

Leineweber, Gunter; and Warnecke, Rolf, to Volkswagen Aktiengesellschaft. Hydraulic amplifier valve assembly. 4,697,497, Cl. 91-372.000.

Lekholm, Anders; and Amundson, David C., to Siemens Aktiengesellschaft. Cardiac pacer for pacing a human heart and pacing method. 4,697,591, Cl. 128-419.0PG.

Leland Stanford Junior University, The Board of Trustees of the: *See*—
Youngquist, Robert C.; Brooks, Janet L.; Fesler, Kenneth A.; Cutler, Cassius C.; and Shaw, Herbert J., 4,697,926, Cl. 356-345.000.

Lemaire, Didier V.; and Dronet, Jean-Marc, to E.P. Remy & Cie. Conveyor for containers. 4,697,695, Cl. 198-803.150.

Lembach, Robert F.; Lewis, Steven D.; and Williams, Robert R., to International Business Machines. Method of optimizing signal timing delays and power consumption in LSI circuits. 4,698,760, Cl. 364-490.000.

Lemmers, Eugene: *See*—
Hammer, Edward E.; and Lemmers, Eugene, 4,698,549, Cl. 313-490.000.

Lenart, Joseph M.: *See*—
Haselton, E. Fletcher; Amstutz, Stanford R.; and Lenart, Joseph M., 4,698,803, Cl. 370-60.000.

Lenk, Erich; and Feth, Max, to Barmag AG. Melt spinning apparatus. 4,698,008, Cl. 425-192.00S.

Leonard, Albert A. Doorless, positive-spreading trawling apparatus. 4,697,372, Cl. 43-9.000.

Leonhardy GmbH: *See*—
Rolf, Helmut, 4,698,026, Cl. 439-82.000.

Leopoldi, Norbert, to Cloverline Incorporated, The. Pill cutter. 4,697,344, Cl. 30-124.000.

Lepage, Joel: *See*—
Bessonneau, Guy; Carnez, Bernard; Derewonko, Henry; and Lepage, Joel, 4,698,661, Cl. 357-74.000.

Lepage, Michel: *See*—
Bordreuil, Jacques; Lepage, Michel; and Bordat, Andre , 4,697,533, Cl. 114-44.000.

Leprince, Philippe; Marec, Jean; Saada, Serge; Bloyet, Emile; and Migne, Jacques, to Centre National de la Recherche Scientifique (C.N.R.S.). Apparatus for exciting a plasma in a column of gas by means of microwaves, in particular for providing an ion laser. 4,698,822, Cl. 372-70.000.

Les Applications Industrielles Vosiennes ("S.A.P.I.V.O.G"): *See*—
Fort, Jacques, 4,697,837, Cl. 294-88.000.

Lesher, George Y.: *See*—
Daum, Sol J.; and Lesher, George Y., 4,698,350, Cl. 514-312.000.

Le Van Mao, Raymond; and Dao, Le H., to Institut Nationale de la Recherche Scientifique. Ethylene light olefins from ethanol. 4,698,452, Cl. 585-640.000.

Levin, Sherman L., to General Electric Company. Temperature control of light modulating fluid in a light valve projection system. 4,698,687, Cl. 358-230.000.

Lewis, David F., to GAF Corporation. Processless color imaging and film therefor. 4,698,296, Cl. 430-333.000.

Lewis, Henry G., Jr.; and Ng, Sheau-Bao, to RCA Corporation. Digital correlation apparatus as for a television deghosting system. 4,698,680, Cl. 358-166.000.

Lewis, Robert T.: *See*—
Santilli, Donald S.; Long, John J.; and Lewis, Robert T., 4,698,322, Cl. 502-74.000.

Lewis, Steven D.: *See*—
Lembach, Robert F.; Lewis, Steven D.; and Williams, Robert R., 4,698,760, Cl. 364-490.000.

Lewis, William K., to Procter & Gamble Company, The. Detergent compositions containing triethylenetetraminehexaacetic acid. 4,698,181, Cl. 252-527.000.

Libey, George S: *See*—
Chrisman, Charles L.; Bidwell, Christopher A.; and Libey, George S, 4,697,546, Cl. 119-3.000.

Lie, Zong Z. Lubricating oil input system. 4,697,553, Cl. 123-73.0AD.

Lieske, Edgar: *See*—
Rose, David; Maak, Norbert; and Lieske, Edgar, 4,698,066, Cl. 8-408.000.

Lignes Telegraphiques et Telephoniques: *See*—
Bouvard, Andre ; and Hulin, Jean Pierre, 4,697,873, Cl. 350-96.230.

Lima-Marques, Luis: *See*—
Spooner, Anthony N.; and Lima-Marques, Luis, 4,697,463, Cl. 73-866.000.

Lin, Lifun: *See*—
Crane, Jacob; Muench, George J.; Saleh, Yousef; and Lin, Lifun, 4,698,140, Cl. 204-146.000.

Linde Aktiengesellschaft: *See*—
Rohde, Wilhelm; Koch, Hannsjorg; and Metschl, Michael, 4,698,072, Cl. 55-31.000.
Rohde, Wilhelm; and Klein, Gunter, deceased, 4,698,073, Cl. 55-33.000.

Lindsey, Steven M.: *See*—
Beasley, James E.; and Lindsey, Steven M., 4,698,521, Cl. 307-270.000.

Lingertat, Helmut: *See*—
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary; and Sarin, Vinod K., 4,698,266, Cl. 428-457.000.

Lingl Corporation: *See*—
Weik, George, 4,698,227, Cl. 425-296.000.

Link, Edward P.; and Kerwawycz, John P., to Xerox Corporation. Method of assembly for optical fiber devices. 4,698,123, Cl. 156-634.000.

Link, Helmut D.; and Keller, Arnold. Device for embedding in bone, in particular a femoral hip-joint prosthesis. 4,698,063, Cl. 623-23.000.

Link, William T., to Baxter Travenol Laboratories, Inc. Techniques for obtaining information associated with an individual's blood pressure including specifically a stat mode technique. 4,697,596, Cl. 128-681.000.

Linton, David J., to Sundstrand Corporation. Bi-directional force limiting no-back mechanism. 4,697,672, Cl. 188-134.000.

Linz, David G.; Grier, Robert K., Jr.; Wetzel, Jennifer A.; and Dada, Abdul G., to General Electric Company. Method and combustion reactor for converting uranium hexafluoride gas to an oxide of uranium. 4,698,214, Cl. 423-260.000.

Liposome Company, Inc., The: *See—*
Janoff, Andrew S.; Rauch, Joyce; and Tilcock, Colin P. S., 4,698,299, Cl. 435-13.000.

Lippman, David H.: *See—*
Bricker, James C.; and Lippman, David H., 4,697,610, Cl. 137-3.000.

Lippold, Duane. Wheelchair carrier. 4,697,975, Cl. 414-462.000.

Lirones, Nick G., to Howmet Turbine Components Corporation. Ceramic porous bodies suitable for use with superalloys. 4,697,632, Cl. 164-369.000.

Litens Automotive Inc.: *See—*
Bytzek, Klaus K.; and Antchak, John R., 4,698,049, Cl. 474-135.000.

Littlewood, Paul A.: *See—*
Graves, Alan F.; and Littlewood, Paul A., 4,698,806, Cl. 370-100.000.

Litton Systems Inc.: *See—*
Cote, Laurence G., 4,698,823, Cl. 372-99.000.
Loomer, Weston R.; and Coons, Randall P., 4,697,977, Cl. 414-662.000.

Liuzzo, James G.; and Proetta, William J., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Keyboard with arrays of function keys. 4,698,618, Cl. 340-365.00R.

Lo, Peter Y. K.; and Ziemelis, Maris J., to Dow Corning Corporation. Curable organopolysiloxane composition. 4,698,406, Cl. 528-12.000.

Lo, Young S.: *See—*
Taylor, Chandler R., Jr.; and Lo, Young S., 4,698,430, Cl. 546-262.000.

Lockhart, Campbell: *See—*
Dedieu, Alain; Lockhart, Campbell; and Jolu, Etienne, 4,698,298, Cl. 435-7.000.

Loeb, Phillip J., to Honeywell Inc. Variable frequency fire tone generator. 4,698,619, Cl. 340-384.00E.

Loew, Werner: *See—*
Detzer, Rudiger; Loew, Werner; and Kohnen, Franz, 4,697,435, Cl. 62-304.000.

Login, Robert B.: *See—*
Tracy, David J.; Login, Robert B.; and Hashem, Mohamed M., 4,698,412, Cl. 528-323.000.

Lohr & Bromkamp GmbH: *See—*
Welschof, Hans-Heinrich; and Schoneberger, Joachim, 4,698,047, Cl. 464-145.000.

Long, David E. High altitude reconnaissance platform. 4,697,761, Cl. 244-62.000.

Long, John J.: *See—*
Santilli, Donald S.; Long, John J.; and Lewis, Robert T., 4,698,322, Cl. 502-74.000.

Longmire, David: *See—*
Woodley, William; and Longmire, David, 4,697,599, Cl. 128-734.000.

Longsworth, Ralph C.; and Steyert, William A., to APD Cryogenics Inc. Parallel wrapped tube heat exchanger. 4,697,635, Cl. 165-147.000.

Loomer, Weston R.; and Coons, Randall P., to Litton Systems, Inc. Safety brake for vertical lift. 4,697,977, Cl. 414-662.000.

Los, Marinus, to American Cynamid Company. 5H-imidazo[2',1':4,-3]imidazo-[1,5a]pyridin-6-ium salts and their use as herbicidal agents. 4,698,092, Cl. 71-92.000.

Lothenbach, Michael; and Herzog, Peter, to AG fur Industrielle Elektronik AGIE. Machine tool pallet that clamps the workpiece to the pallet. 4,698,475, Cl. 219-69.00W.

Lowe, William F., to E-Z Machine Corp. Apparatus for applying strip reinforcing to sheet material. 4,698,114, Cl. 156-353.000.

Lowell, Thomas A. Piano soundboard downbearing force simulator. 4,697,494, Cl. 84-458.000.

Lu, Hsi H. Ground anchor with recoverable steel rods. 4,697,394, Cl. 52-162.000.

Lu, Shwu-Ching. Combined hydrometer for testing the battery and radiator fluid. 4,697,454, Cl. 73-440.000.

Lucci, Roberto; and Orlandini, Paolo, to Fantoni Arredamenti S.p.A. Adjustable chair. 4,697,846, Cl. 297-298.000.

Luck, Edwin, to Ingersoll Cutting Tool Company. Insert clamping device and insert therefor. 4,697,963, Cl. 407-105.000.

Luigi, Nava P., to Nava & C. S.p.A. Protective device applicable to helmets, especially for sports use. 4,697,289, Cl. 2-422.000.

Lum, Kin K.: *See—*
Moore, William H.; Weaver, Max A.; and Lum, Kin K., 4,698,651, Cl. 503-227.000.

Lummus Crest, Inc.: *See—*
Tsao, Utah; and Kettell, Joseph, 4,698,219, Cl. 423-563.000.

Lunsford, Thomas J. Portable enclosed hygenic workstation. 4,697,854, Cl. 312-223.000.

Luther, Hans W.: *See—*
Bocker, Jurgen; Luther, Hans W.; Wallow, Peter; and Fritsch, Horst, 4,697,525, Cl. 102-518.000.

Lynch, Charles E.; and Wilkinson, William K., to Du Pont de Nemours, E. I., and Company. Acrylic fiber suitable for preparing carbon or graphite fibers. 4,698,413, Cl. 525-328.500.

Lysen, Heinrich, to Pruftechnik Dieter Busch & Partner GmbH & Co. Device for ascertaining alignment errors in shafts arranged in tandem. 4,698,491, Cl. 250-201.000.

M.A.N.-Roland Druckmaschinen Aktiengesellschaft: *See—*
Simeth, Claus, 4,697,512, Cl. 101-142.000.

M&T Chemicals Inc.: *See—*
Cronin, John V., 4,698,284, Cl. 430-5.000.

Ma, Mark J. S. Cranked patio umbrella featuring cranked tilt. 4,697,606, Cl. 135-20.00M.

Maack, David R.: *See—*
Krohn, David A.; Maack, David R.; Vinarub, Edmond I.; and Ellison, John R., Jr., 4,698,616, Cl. 340-347.00P.

Maak, Norbert: *See—*
Rose, David; Maak, Norbert; and Lieske, Edgar, 4,698,066, Cl. 8-408.000.

Mabe, James A.; and Nakatsukasa, Walter M., to Eli Lilly and Company. Recombinant DNA cloning vectors containing selectable genetic markers for use in streptomyces and related organisms. 4,698,307, Cl. 435-253.000.

MacDougall, Frederick W.; and Murphy, Thomas A., to Aerovox Incorporated. Pressure sensitive interrupters for capacitors. 4,698,725, Cl. 361-272.000.

MacGregor, Douglas B.: *See—*
Thompson, Robert R.; Mothersole, David S.; and MacGregor, Douglas B., 4,698,747, Cl. 364-200.000.

MacGregor, Ian: *See—*
Kentfield, John A. C.; and MacGregor, Ian, 4,697,988, Cl. 416-237.000.

Macher, Ingolf; and Unger, Frank M., to Sandoz Ltd. 2,3-diamino-2,3-didesoxyhexose derivatives and their use. 4,698,331, Cl. 514-25.000.

Machida, Kiyosada; Nakano, Yoshiyuki; and Matsukawa, Nobuo, to Nippon Kogaku K.K. Power source device with reserve power source for camera. 4,697,909, Cl. 354-484.000.

Machida, Yoshimasa: *See—*
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, 4,698,336, Cl. 514-202.000.

Macho Products, Inc.: *See—*
Cho, Soo S., 4,697,286, Cl. 2-22.000.

Macintyre, Robert M., to Rolls-Royce plc. Metal surface hardening by carbide formation. 4,698,237, Cl. 427-53.100.

Mackie, Gregory C.; Satra, Stephen E.; and Chen, Chih-Ming, to Electronic Engineering and Manufacturing, Inc. Audio processing system for restoring bass frequencies. 4,698,842, Cl. 381-1.000.

Macrander, Max S.: *See—*
Mills, Jeffrey P.; and Macrander, Max S., 4,698,771, Cl. 364-768.000.

Maddock, Mitchell E. Underground irrigation apparatus and method for using same. 4,697,952, Cl. 405-43.000.

Maddux, Gordon T.: *See—*
Maddux, Irene H.; and Maddux, Gordon T., 4,697,592, Cl. 450-155.000.

Maddux, Irene H.; and Maddux, Gordon T. Support system. 4,697,592, Cl. 450-155.000.

Madray, Herbert R. Metal building construction. 4,697,393, Cl. 52-93.000.

Madsen, Henning S.; Sergero, Tommy S.; and Johansson, Karl A., to Telefonaktiebolaget L M Ericsson. Method of producing electroacoustic converters, preferably microphones, and converters produced according to the method. 4,697,334, Cl. 29-594.000.

Maeda, Sadao, to Maeda Shell Service Co., Ltd. Integrally molded hammer with separated head and handle cores. 4,697,481, Cl. 81-22.000.

Maeda Shell Service Co., Ltd.: *See—*
Maeda, Sadao, 4,697,481, Cl. 81-22.000.

Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, to Kabushiki Kaisha Toshiba; and Fuji Photo Film Co., Ltd. Device for containing a radiation recording medium. 4,697,902, Cl. 354-281.000.

Maffey, Constant O. Security device for trailer. 4,697,444, Cl. 70-232.000.

Magara, Takuji: *See—*
Aramaki, Jun; Karashima, Toshiharu; Magara, Takuji; and Ushida, Minoru, 4,698,477, Cl. 219-69.00R.

Magnier, Claude: *See—*
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,698,175, Cl. 252-182.000.

Mahoney, Thomas J.; and Lang, Michael, to Robot Defense Systems, Inc. Three-dimensional laser imaging transmitter/receiver. 4,698,498, Cl. 250-234.000.

Maier, Peter: *See—*
Reuter, Horst; Quast, Jorn-Rainer; Maier, Peter; and Brenner, Heinrich, 4,697,793, Cl. 267-195.000.

Maitland, Arthur; Menown, Hugh; Strudwick, Ian A.; Weatherup, Clifford R.; and Carman, Robert J., to English Electric Valve Company Limited. Apparatus for forming electron beams. 4,698,546, Cl. 313-446.000.

Majestic Industries, Inc.: *See—*
Geiger, John A., 4,697,945, Cl. 402-75.000.

Majors, Anthony P. Refuse receptacle for receiving disposable refuse bags. 4,697,771, Cl. 248-97.000.

Makaryk, Walter A.; Dudar, Thomas E.; and Zentz, Mary K., to Baxter Travenol Laboratories, Inc. Injection site package. 4,698,061, Cl. 604-408.000.

Makino, Daisuke: *See*—
Koibuchi, Shigeru; Isobe, Asao; and Makino, Daisuke, 4,698,291, Cl. 430-196.000.

Malabarba, Adriano; and Cavalleri, Bruno, to Gruppo Lepetit, S.p.A. Process for preparing antibiotic L 17046. 4,698,418, Cl. 530-317.000.

Malaise, Jacques J.: *See*—
Branigan, John T.; and Malaise, Jacques J., 4,698,638, Cl. 343-725.000.

Malestein, Teus. Apparatus and method for rearing and/or keeping animals. 4,697,547, Cl. 119-18.000.

Malestein, Teus. Device and method for keeping animals. 4,697,548, Cl. 119-22.000.

Malings, Michael J.: *See*—
Holden, Ian; and Malings, Michael J., 4,698,779, Cl. 364-520.000.

Maloney, Patrick M.: *See*—
Bradshaw, Franklin C.; and Maloney, Patrick M., 4,697,940, Cl. 400-134.600.

Maloney, Terrance R. Electric feedback guitar. 4,697,491, Cl. 84-1.050.

Mamiya, Toshiharu: *See*—
Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; and Endo, Takashi, 4,698,650, Cl. 346-134.000.

Mandai, Haruhumi: *See*—
Imamura, Eiji; Kumokawa, Takashi; Nakayama, Fumio; Mandai, Haruhumi; Fukutani, Iwao; and Tomono, Kunisaburo, 4,698,605, Cl. 333-184.000.

Mandel, Alan F.; Eichler, Kenneth M.; Trosky, William J.; and Moore, William H., to Westinghouse Electric Corp. Method of monitoring an elevator system. 4,698,780, Cl. 364-550.000.

Maner, Asim: *See*—
Ehrfeld, Wolfgang; Maner, Asim; and Munchmeyer, Dietrich, 4,698,285, Cl. 430-5.000.

Mannesmann Aktiengesellschaft: *See*—
Behnke, Klaus; and Munzenbrock, Anton, 4,698,565, Cl. 318-318.000.
Bungeroth, Herbert; and Wessel, Otto, 4,697,631, Cl. 164-46.000.

Mannesmann Rexroth GmbH: *See*—
Dantlgraber, Jorg; Budel, Josef; and Rub, Josef, 4,697,990, Cl. 417-204.000.
Dantlgraber, Jorg, 4,697,996, Cl. 418-31.000.

Mannhardt, Karl: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, 4,698,341, Cl. 514-230.000.

Manning, Frank E.: *See*—
Durkee, Darryl L.; Manning, Frank E.; and Gilliam, Frank D., 4,697,601, Cl. 128-777.000.

Mannucci, Emanuela: *See*—
De Regis, Massimo; and Mannucci, Emanuela, 4,698,354, Cl. 514-357.000.

Mantello, Ralph, to Power Conversion Inc. Safety vent device for electrochemical cells. 4,698,282, Cl. 429-56.000.

Mao, Chung-Ling, to Air Products and Chemicals, Inc. Nonwoven binder emulsions of vinyl acetate/ethylene copolymers having improved solvent resistance. 4,698,384, Cl. 524-458.000.

Marabini, Anna: *See*—
Bertini, Vincenzo; Marabini, Anna; De Munno, Angela; Barbaro, Maria; and Pocci, Marco, 4,698,171, Cl. 252-60.000.

Marchand, Gerard: *See*—
Blanc, Michel; Pollard, Jean; Marchand, Gerard; and Henri, Rene , 4,697,867, Cl. 350-96.100.

Marcotte, Richard P.; and Dumont, John W., Jr., to Dumont Holding Company. Underfed stoker boiler for burning bituminous coal and other solid fuel particles. 4,697,530, Cl. 110-234.000.

Marec, Jean: *See*—
Leprince, Philippe; Marec, Jean; Saada, Serge; Bloyet, Emile; and Migne, Jacques, 4,698,822, Cl. 372-70.000.

Maresca, Louis M.: *See*—
Robeson, Lloyd M.; Harris, James E.; Kawakami, James H.; and Maresca, Louis M., 4,698,390, Cl. 525-133.000.

Maresca, Robert L., to North American Philips Corporation. Tri-state switching controller for reciprocating linear motors. 4,698,576, Cl. 318-687.000.

Margraf, David J.: *See*—
Portman, Joe L., Jr.; and Margraf, David J., 4,697,657, Cl. 177-210.0FP.

Marihart, John R., to Pacific Micro Minerals, Inc. Process for preparation of compositions for modifying plant growth; compositions for plant growth modification; and method for the use thereof. 4,698,090, Cl. 71-24.000.

Marin, Carlo; Lanfranconi, Gianmario; and Borroni, Andrea, to Societa' Cavi Pirelli S.p.A. Granulator for cross-linkable plastic. 4,698,009, Cl. 425-196.000.

Maring, Clarence J.: *See*—
White, David R.; and Maring, Clarence J., 4,698,436, Cl. 549-361.000.

Marinkovich, Vincent S. Disposable mouth-to-mouth resuscitation device. 4,697,587, Cl. 128-203.110.

Marino, Joseph A. Connecting blocks. 4,698,023, Cl. 434-259.000.

Marinoni, Giorgio; and Capello, Giuseppe, to Comau S.p.A. Industrial robot for welding and cutting by means of a laser beam. 4,698,483, Cl. 219-121.0LU.

Marlin Firearms Company: *See*—
Brophy, William S., 4,697,367, Cl. 42-71.010.

Marlow, Raymond; and Nelson, John L., Jr. Ground speed determining radar system. 4,698,636, Cl. 342-104.000.

Marple, Wendell P.; and Miller, Hubert A., to International Business Machines Corporation. Edge detection using dual trans-impedance amplifier. 4,698,528, Cl. 307-517.000.

Marshall, Gerald F.: *See*—
Keem, John E.; and Marshall, Gerald F., 4,698,833, Cl. 378-84.000.

Marshall, Steven G. Fluid-containing security device. 4,698,620, Cl. 340-568.000.

Marten, Russell A.: *See*—
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.

Martin, Eugene G.; and Martin, Harold C., to Favorite Manufacturing, Inc. Chicken thigh skinner. 4,697,307, Cl. 17-11.000.

Martin, Harold C.: *See*—
Martin, Eugene G.; and Martin, Harold C., 4,697,307, Cl. 17-11.000.

Martin, James A. Dental instrument. 4,698,019, Cl. 433-144.000.

Martin, Russell D. Finger grip attachment for a fishing rod. 4,697,377, Cl. 43-23.000.

Martin, Thomas E. Pressure washer systems analyzer. 4,697,464, Cl. 73-866.300.

Marton, Bela: *See*—
Rice, Joseph A., Jr.; McGregor, Douglas D.; Colegrove, Forrest D.; and Marton, Bela, 4,697,519, Cl. 102-406.000.

Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, to Nippon Steel Corporation. Process for producing, by continuous annealing, soft blackplate for surface treatment. 4,698,102, Cl. 148-2.000.

Maruta, Riichiro: *See*—
Inoue, Takayuki; Hattori, Masafumi; Hayama, Kazuhide; and Maruta, Riichiro, 4,698,395, Cl. 525-327.800.

Maruyama, Masayoshi: *See*—
Nakaya, Tsutomu; and Maruyama, Masayoshi, 4,697,757, Cl. 242-68.500.

Maruyama, Yuji: *See*—
Kobayashi, Takashi; and Maruyama, Yuji, 4,697,906, Cl. 354-416.000.

Marwood, Warren; and Clarke, Allen P., to Commonwealth of Australia, The. Self repair large scale integrated circuit. 4,698,807, Cl. 371-11.000.

Marx, Matthias: *See*—
Straehle, Wolfgang; Marx, Matthias; and Schuett, Uwe, 4,698,410, Cl. 528-76.000.
Werner, Frank; Marx, Matthias; and Schmidt, Hans U., 4,698,371, Cl. 521-131.000.

Masaki, Kazumi: *See*—
Endo, Yoichi; and Masaki, Kazumi, 4,697,581, Cl. 128-41.000.

Maschinenfabrik Muller-Weingarten AG: *See*—
Harsch, Erich; and Reichenbach, Reiner, 4,697,449, Cl. 72-405.000.

Maser, Kenneth R. Leakage test for liquid containment. 4,697,456, Cl. 73-592.000.

Mason, Bradley R.; Mason, Jeffrey T.; and Cawley, Patrick W., to Don Joy Orthopedic, Inc. Four-point anterior cruciate ligament brace. 4,697,583, Cl. 128-80.00C.

Mason, Jeffrey T.: *See*—
Mason, Bradley R.; Mason, Jeffrey T.; and Cawley, Patrick W., 4,697,583, Cl. 128-80.00C.

Masot, Oscar V. Circuit breaker panels with alarm system. 4,698,621, Cl. 340-639.000.

Masquelier, Jack, to Societe Civile d'Investigations Pharmacologiques d'Aquitaine; and Horphag Overseas Ltd. Plant extract with a proanthocyanidins content as therapeutic agent having radical scavenger effect and use thereof. 4,698,360, Cl. 514-456.000.

Masse, Jean, to Commissariat a l'Energie Atomique; and Service National Electricite de France. Heat exchanger equipped with emergency cooling means and fast neutron nuclear reactor incorporating such an exchanger. 4,698,201, Cl. 376-298.000.

Massett, Stephen S., to Pfizer Inc. 1,1-bis(p-fluorophenyl)urea. 4,698,444, Cl. 564-54.000.

Mastumoto, Makoto; and Hayama, Mamoru, to Mazda Motor Corporation. Automatic cruise control system for a motor vehicle. 4,697,478, Cl. 74-859.000.

Masuda, Masami: *See*—
Daiko, Yoichi; Masuda, Masami; and Terabayashi, Takao, 4,697,964, Cl. 408-6.000.

Masuda, Youichi: *See*—
Onodera, Toshihiro; and Masuda, Youichi, 4,698,743, Cl. 363-136.000.

Masutomi, Susumu: *See*—
Inagaki, Takafumi; Sasaoka, Hiroshi; Masutomi, Susumu; Itoh, Hiroshi; and Takada, Mitsuru, 4,698,764, Cl. 364-424.100.

Matena, Jan: *See*—
Verheul, Hans H.; and Matena, Jan, 4,698,814, Cl. 371-49.000.

Mathison, John W. Basketball training device. 4,697,810, Cl. 273-1.50A.

Mathuno, Shigeki: *See*—
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.

Matievic, Miroslav, to Emhart Industries, Inc. Multi-signal alarm. 4,697,932, Cl. 368-255.000.

Matsubara, Nobuyuki: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Matsubara, Shigeharu: *See*—
Fujii, Masahiro; Kamada, Minoru; and Matsubara, Shigeharu, 4,698,158, Cl. 210-610.000.

Matsueda, Rei; Yabe, Yuichiro; Yamazaki, Mitsuo; Kokubu, Tatsuo; and Hiwada, Kunio, to Sankyo Company, Limited. New renin-inhibitory peptides and their use. 4,698,329, Cl. 514-18.000.

Matsui, Akira: *See*—
Sugawara, Masayoshi; Nakamura, Yuichi; and Matsui, Akira, 4,697,466, Cl. 74-27.000.

Matsui, Kazuhiro; Tanigawa, Mitsuru; and Sugiura, Haruyuki, to Kitagawa Industries Co., Ltd. Withdrawal apparatus for a card-like structure. 4,697,303, Cl. 16-112.000.

Matsui, Kazuma: *See*—
Tsukahara, Kengi; Matsui, Kazuma; Abe, Taizoh; and Suzuki, Masahiko, 4,697,991, Cl. 417-219.000.

Matsui, Tatsuro: *See*—
Nakagima, Masashi; Kojima, Hiroshi; Matsui, Tatsuro; and Dokoshi, Noriaki, 4,698,407, Cl. 528-14.000.

Matsukawa, Nobuo: *See*—
Machida, Kiyosada; Nakano, Yoshiyuki; and Matsukawa, Nobuo, 4,697,909, Cl. 354-484.000.

Matsumoto, Kouji, to NEC Corporation. TTL-ECL level converter operable with small time delay by controlling saturation. 4,698,527, Cl. 307-475.000.

Matsumoto, Shungo: *See*—
Doi, Sadao; Yamada, Tohru; Matsumoto, Shungo; and Yamamoto, Taizo, 4,697,644, Cl. 172-123.000.

Matsumoto, Yasuo: *See*—
Koshino, Minoru; and Matsumoto, Yasuo, 4,698,754, Cl. 364-200.000.

Matsumura, Yoshitake: *See*—
Abe, Kunihiro; Matsumura, Yoshitake; and Morozumi, Takurou, 4,698,765, Cl. 364-431.040.

Matsunaga, Isao: *See*—
Tanemura, Mitsuru; Matsunaga, Isao; and Saitou, Masami, 4,698,364, Cl. 514-563.000.

Matsuo, Yasutoshi, to Victor Company of Japan, Ltd. Noise reduction circuit for video tape recording and playback apparatus. 4,698,696, Cl. 358-340.000.

Matsushita Electric: *See*—
Ogawa, Kazufumi, 4,698,113, Cl. 156-275.700.

Matsushita Electric Industrial Co., Ltd.: *See*—
Kishimoto, Yoshio, 4,698,488, Cl. 219-549.000.
Kuramoto, Yukimasa; Oonishi, Hajimu; Sakai, Yukio; Hayashi, Yoshiki; and Wells, Robert C., 4,697,913, Cl. 355-3.00R.
Ookubo, Hiroaki, 4,697,943, Cl. 400-568.000.
Tada, Haruo; and Nakada, Akiyoshi, 4,697,978, Cl. 414-729.000.
Takubo, Yoneharu; Horibe, Yasutaka; and Yamanishi, Nobue, 4,697,889, Cl. 350-392.000.
Tomita, Masao; and Hashima, Akio, 4,698,694, Cl. 358-326.000.

Matsuzaka, Kenzo; Okano, Seitaro; and Nakamura, Nobuo, to Canon Kabushiki Kaisha. Optical element forming apparatus. 4,698,089, Cl. 65-290.000.

Matsuzaka, Takayoshi: *See*—
Sugawara, Kokichi; and Matsuzaka, Takayoshi, 4,698,714, Cl. 360-133.000.

Matsuzaki, Harumi; Kubota, Masayoshi; Ebara, Katsuya; Takahashi, Sankichi; and Kuroiwa, Minoru, to Hitachi, Ltd. Apparatus for producing ultra-pure water by ion exchange resin. 4,698,153, Cl. 210-192.000.

Matteson, Michael J., to Georgia Tech Research Corporation. Automated interfacial tensiometer. 4,697,451, Cl. 73-64.400.

Mattison, Phillip L.: *See*—
Kokko, Kent S.; and Mattison, Phillip L., 4,698,429, Cl. 546-179.000.

Matty, Thomas C., to Westinghouse Electric Corp. Cable stereo apparatus. 4,698,670, Cl. 358-86.000.

Matyskella, James J.: *See*—
Winland, Virgil L.; and Matyskella, James J., 4,697,611, Cl. 137-14.000.

Mautz, Karl E.: *See*—
Berglund, Robert K.; Mautz, Karl E.; and Tyldesley, Roger, 4,698,128, Cl. 156-643.000.

Mavros, Stratos, to Parmatic Filter Corporation. Separator assembly. 4,698,078, Cl. 55-213.000.

Maxwell, James W., to Texas Instrument Incorporated. Rack for input-/output modules for a programmable controller. 4,698,024, Cl. 439-62.000.

Maxwell, Richard L. Planetary worm gear apparatus, and methods of constructing and utilizing same. 4,697,476, Cl. 74-785.000.

May & Baker Limited: *See*—
Hart, Terance W., 4,698,363, Cl. 514-530.000.

May, Billy D., to Boats of the Future, Inc. Shrimping/fishing net with vibratory bottom roller. 4,697,373, Cl. 43-9.000.

May-Curran Associates: *See*—
May, Richard L.; and May, Jonathan R., 4,698,043, Cl. 446-273.000.

May, Jonathan R.: *See*—
May, Richard L.; and May, Jonathan R., 4,698,043, Cl. 446-273.000.

May, Richard L.; and May, Jonathan R., to May-Curran Associates. Rolling egg toy. 4,698,043, Cl. 446-273.000.

Maya, Jakob: *See*—
Grossman, Mark W.; George, William A.; and Maya, Jakob, 4,698,547, Cl. 313-485.000.

Maycock, Ian C.; and Crawford, Peter F., to Automotive Products plc. Friction clutch driven plate. 4,697,684, Cl. 192-107.00R.

Mayo, William T., Jr., to North American Philips Corporation. Displaying a single parameter image. 4,697,594, Cl. 128-653.000.

Maytag Company, The: *See*—
Wilson, James D., 4,697,687, Cl. 194-344.000.

Mazda Motor Corporation: *See*—
Hiketa, Manabu, 4,697,471, Cl. 74-359.000.
Mastumoto, Makoto; and Hayama, Mamoru, 4,697,478, Cl. 74-859.000.
Satoh, Osamu, 4,698,570, Cl. 318-568.000.

McCarty, Robert S., to Garrett Corporation, The. Lubrication apparatus. 4,697,414, Cl. 60-39.080.

McCaskill, Rex A.; and Wang, John S., to International Business Machines Corp. Graphic highlight adjacent a pointing cursor. 4,698,625, Cl. 340-709.000.

McCaskill, Rex A.: *See*—
Barker, Barbara A.; Hernandez, Irene H.; and McCaskill, Rex A., 4,698,624, Cl. 340-709.000.

McClelland, Mark E.: *See*—
Mullersman, Ferdinand H.; and McClelland, Mark E., 4,698,578, Cl. 320-13.000.

McCloud, John W., II: *See*—
Gantzhorn, John E., Jr.; McCloud, John W., II; and Uhler, Robert O., 4,698,701, Cl. 360-16.000.

McClure, George R.; and Vassiliou, Eustathios, to Du Pont de Nemours, E. I., and Company. Plasticized poly(vinyl fluoride). 4,698,382, Cl. 524-292.000.

McConaghy, James R., Jr., to Conoco Inc. Short residence time hydrogen donor diluent cracking process. 4,698,147, Cl. 208-107.000.

McCracken, Alan; Dominiani, Frank J., Jr.; and DeJarnette, Edward A., Jr., to FMC Corporation. Microtube applicator system. 4,697,739, Cl. 239-127.000.

McDavid, Larry S.: *See*—
Bachman, Thomas E.; McDavid, Larry S.; and Trueblood, David M., 4,697,450, Cl. 73-23.000.

McDermott International, Inc.: *See*—
Aghili, Hafez K., 4,698,081, Cl. 62-24.000.

McDonnell Douglas Corporation: *See*—
Bar-Cohen, Yoseph, 4,698,541, Cl. 310-326.000.
Jeffery, Jon R.; and Pierce, Neil J., 4,697,419, Cl. 60-464.000.

McGregor, Douglas D.: *See*—
Rice, Joseph A., Jr.; McGregor, Douglas D.; Colegrove, Forrest D.; and Marton, Bela, 4,697,519, Cl. 102-406.000.

McKee, Bobby D., to Westinghouse Electric Corp. Brush assembly for a homopolar generator. 4,698,540, Cl. 310-239.000.

McKenna, Arthur J., to 139316 Canada Inc. Dart. 4,697,815, Cl. 273-420.000.

McLaughlin, James M.: *See*—
Gradecki, Raymond J.; McLaughlin, James M.; and Sorensen, Gerald R., 4,697,710, Cl. 211-45.000.

McMullin, Wayne A.: *See*—
Bhowmik, Anup; and McMullin, Wayne A., 4,698,815, Cl. 372-2.000.

McPhaul, Charlotte W. Fishing tackle box with flashlight and internal lighting. 4,697,379, Cl. 43-54.100.

McPherson, Ross; Smolik, Kenneth F.; and Thomson, David J., to American Telephone and Telegraph Company; and Bell Telephone Laboratories, Incorporated. Supervisory audio tone detection in a radio channel. 4,698,769, Cl. 364-724.000.

Mead, James B.; Bevan, Robert; and Schwartz, Leonard, to Singer Company, The. Circularly polarized leaky waveguide doppler antenna. 4,698,639, Cl. 343-756.000.

Meadows, Robert D.; Krein, Philip T.; and Murdock, Bruce, to Tektronix, Inc. Touch panel with automatic frequency control. 4,698,461, Cl. 178-19.000.

Meadows, Robert D.: *See*—
Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,698,460, Cl. 178-19.000.

Mect Corporation: *See*—
Ogasawara, Sadanori; Hanafusa, Takashi; Kariya, Katsuhide; Ito, Masayoshi; and Shitori, Yoshiyasu, 4,698,332, Cl. 514-42.000.

Medi-Tech, Inc.: *See*—
Ciannella, Michael A., 4,698,056, Cl. 604-164.000.

Medicorp Research Laboratories Corp.: *See*—
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,697,574, Cl. 128-1.00D.

Medler, Eberhard: *See*—
Dengler, Alfred; and Medler, Eberhard, 4,697,741, Cl. 239-391.000.

Meguriya, Noriyuki: *See*—
Hida, Yoshinori; Meguriya, Noriyuki; and Yoshida, Akira, 4,697,877, Cl. 350-96.300.

Meigs, Gordon W.: *See*—
Baur, Bruce K.; and Meigs, Gordon W., 4,698,559, Cl. 315-408.000.

Meister, Siegfried. Process and apparatus for the heat treatment of meals. 4,698,487, Cl. 219-506.000.

Melhjo, Carl G. Heat exchanger with helical fluid flow. 4,697,636, Cl. 165-156.000.

Meneely, Vincent A. Compression relief engine brake. 4,697,558, Cl. 123-321.000.

Menicacci, Ivano. Attachment for a partial, removable, dental prothesis. 4,698,020, Cl. 433-177.000.

Menown, Hugh: *See*—
Maitland, Arthur; Menown, Hugh; Strudwick, Ian A.; Weatherup, Clifford R.; and Carman, Robert J., 4,698,546, Cl. 313-446.000.

Merck Patent Gesellschaft mit beschraenkter Haftung: *See*—
Hausberg, Hans-Heinrich; Bottch, Henning; Gottschlich, Rudolf; Seyfried, Christoph; and Minck, Klaus-Otto, 4,698,351, Cl. 514-338.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Henkel, Eberhard; Dolabdjian, Barkew; Helger, Roland; Klink, Rainer; and Wurzburg, Uwe, 4,698,300, Cl. 435-18.000.

Mere, Ilmar: *See*—
Johnson, William M.; and Mere, Ilmar, 4,697,646, Cl. 172-720.000.

Merk, Robert H.: *See*—
Brewer, Richard A.; Merk, Robert H.; and Orndorff, Gary J., 4,697,505, Cl. 99-450.100.

Merli, Gabriele; and Testi, Termano, to GTE Telecommunicazioni S.p.A. Suppressed-fundamental frequency three-way predistorter. 4,698,597, Cl. 328-163.000.

Merrell Dow Pharmaceuticals Inc.: *See*—
Schnettler, Richard A.; Jones, Winton D., Jr.; and Claxton, George P., 4,698,353, Cl. 514-340.000.

Mertz, William J.; and O'Brien, William L., to National Distillers and Chemical Corporation. Liquid copolyester plasticizers derived from 1,4-butanediol and a dicarboxylic acid mixture. 4,698,383, Cl. 524-314.000.

Messer, Wayne R., to Hercules Incorporated. Plasma developable photoresist compositions containing perylene coumarin photosensitizer. 4,698,286, Cl. 430-17.000.

Metal Box P.L.C.: *See*—
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,697,718, Cl. 220-82.00R.

Metschl, Michael: *See*—
Rohde, Wilhelm; Koch, Hannsjorg; and Metschl, Michael, 4,698,072, Cl. 55-31.000.

Meyer, Heinrich: *See*—
Brenner, Heinz; Meyer, Heinrich; and Schmidt, Kurt, 4,697,794, Cl. 267-195.000.

Meyer, Rolf-Volker; Kreuder, Hans-Joachim; and Hohl, Erwin, to Bayer Aktiengesellschaft. Cyclic amidines useful as catalysts in the hardening of epoxide resins. 4,698,426, Cl. 544-253.000.

Meyers, Paul A.: *See*—
Dorman, Linneaus C.; and Meyers, Paul A., 4,698,375, Cl. 523-115.000.

Michaels, Stephen L.: *See*—
Bailey, Richard B.; Joshi, Dilip K.; Michaels, Stephen L.; and Wisdom, Richard A., 4,698,303, Cl. 435-139.000.

Mickelson, James E.: *See*—
Johnson, Harold R., III; Phillips, Allyn E.; Carrigan, Erwin R.; Virgo, Richard A.; and Mickelson, James E., 4,697,675, Cl. 192-7.000.

Micronix Corporation: *See*—
Northrup, Ronnie; and Fay, Bernard, 4,698,834, Cl. 378-34.000.

MicroSpun Technologies Inc.: *See*—
Bumpers, Norman R., 4,698,156, Cl. 210-331.000.

Miele & Cie. GmbH & Co.: *See*—
Brinkhoff, Helmut; Gloning, Gunter; and Steinkotter, Heinz-Gunter, 4,697,299, Cl. 15-323.000.

Migne, Jacques: *See*—
Leprince, Philippe; Marec, Jean; Saada, Serge; Bloyet, Emile; and Migne, Jacques, 4,698,822, Cl. 372-70.000.

Milberger, Walter E.: *See*—
Jones, Franklin B.; Milberger, Walter E.; Bulgher, David E.; and Kerfoot, Charles S., 4,698,742, Cl. 363-124.000.

Milewits, Marvin: *See*—
Moake, Gordon L.; and Milewits, Marvin, 4,698,590, Cl. 324-160.000.

Milgram, Paul, to Canadian Industrial Innovation Centre/Waterloo. Apparatus for influencing the presentation of visual information. 4,698,668, Cl. 358-92.000.

Milianowicz, Stanislaw A., to Westinghouse Electric Corp. Multiple-impact shock-absorbing assembly for circuit interrupter and other apparatus. 4,698,470, Cl. 200-288.000.

Miller, Hubert A.: *See*—
Marple, Wendell P.; and Miller, Hubert A., 4,698,528, Cl. 307-517.000.

Miller, Ira; and Hanna, John E., to Motorola, Inc. DC to DC converter. 4,698,737, Cl. 363-63.000.

Miller, John A.; and Walker, James D., to Unisys Corporation. Parallel connected power supplies having parallel connected control circuits which equalize output currents to a load even after one supply is turned off. 4,698,738, Cl. 363-65.000.

Miller, Maria L.: *See*—
Lee, Len F.; and Miller, Maria L., 4,698,093, Cl. 71-94.000.

Miller, Robert C.; and Asars, Juris A., to Westinghouse Electric Corp. Direct current magneto-optic current transformer. 4,698,497, Cl. 250-231.00R.

Miller, Robert L.: *See*—
Lake, David E., Jr.; and Miller, Robert L., 4,698,666, Cl. 358-22.000.

Miller, Ross C.: *See*—
Wickham, John L.; Fox, Jeffrey D.; and Miller, Ross C., 4,697,318, Cl. 29-33.00P.

Milligan, Brian: *See*—
Evans, Neil A.; Milligan, Brian; and Waters, Peter J., 4,698,064, Cl. 8-128.00R.

Mills, Donald C.: *See*—
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.

Mills, Jeffrey P.; and Macrander, Max S., to GTE Communication Systems Corporation. Adder circuit for encoded PCM samples. 4,698,771, Cl. 364-768.000.

Mills, Kenneth L., to Nite-Striker Company, Inc., The. Fishing pole tip position signalling light assembly. 4,697,375, Cl. 43-17.500.

Mills, Ross N.: *See*—
Drago, Gary A.; Baier, Walter F.; Lee, Francis C.; Mills, Ross N.; and Mossbrugger, Horst G., 4,698,644, Cl. 346-140.00R.

Mimura, Isao: *See*—
Okuyama, Masayoshi; Kido, Yukio; Mimura, Isao; and Nakajima, Etsuro, 4,697,931, Cl. 368-223.000.

Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, to Adeka Argus Chemical Co., Ltd. N,N',N''-tris((2,2,6,6-tetramethyl-4-piperidyl)triazinyl) undecane triamines as stabilizers for synthetic polymers. 4,698,381, Cl. 524-100.000.

Minami, Katsuhiro; Iwata, Hitoshi; and Kinoshita, Kenichi, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Light control apparatus for automobile. 4,698,552, Cl. 315-82.000.

Minami, Shinzaburo: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Minasian, John L. Means and techniques useful in marking X-ray film. 4,698,836, Cl. 378-162.000.

Minck, Klaus-Otto: *See*—
Hausberg, Hans-Heinrich; Bottch, Henning; Gottschlich, Rudolf; Seyfried, Christoph; and Minck, Klaus-Otto, 4,698,351, Cl. 514-338.000.

Mine, Kiyomitsu; Kobayashi, Yayoi; Kawaguchi, Yasushi; and Inokuma, Hiroyuki, to Konishiroku Photo Industry Co., Ltd. Magnetic recording medium. 4,698,280, Cl. 428-425.900.

Minigrip, Inc.: *See*—
Ausnit, Steven; and Van Erden, Donald L., 4,698,274, Cl. 428-36.000.
Takahashi, Katsuhito, 4,698,118, Cl. 156-499.000.

Ministry of International Trade & Industry: *See*—
Haruta, Masatake; Sano, Hiroshi; and Kobayashi, Tetsuhiko, 4,698,324, Cl. 502-243.000.
Tao, Hiroaki, 4,698,314, Cl. 436-171.000.

Minnesota Mining and Manufacturing Company: *See*—
Burvee, Richard W., 4,698,724, Cl. 361-220.000.
Hanson, Gary R., 4,697,970, Cl. 412-4.000.
Sauk, John J.; and Van Kampen, Craig L., 4,698,326, Cl. 514-7.000.
Wasserman, Allan, 4,697,407, Cl. 57-238.000.

Minnetti, Federico, to Officine Minnetti di Federico Minnetti & C.S.a.s. System and a process for orienting as required bored frusto-conical and/or cylindrical bodies, usually yarn reels or cones fed in bulk. 4,697,690, Cl. 198-395.000.

Mino, Takeyasu; and Harada, Mitsuaki, to Sinter Limited. Method and installation for drying a continuous material impregnated with a hardenable synthetic resin. 4,697,355, Cl. 34-41.000.

Minolta Camera Kabushiki Kaisha: *See*—
Kimura, Kazuo; Tanimoto, Tetsuyuki; and Kobayashi, Hiroshi, 4,697,878, Cl. 350-162.110.
Osawa, Izumi; Doi, Isao; and Natsuhara, Toshiya, 4,698,287, Cl. 430-57.000.
Takano, Yoshiaki; and Kinoshita, Keichi, 4,697,917, Cl. 355-14.00R.

Minowa, Toshio; Hashimoto, Tetsuro; Kuroda, Kohji; and Nakayama, Kazutaka, to Asahi Glass Company, Ltd.; and Noritake Co., Limited. Display device and decal for forming a display panel terminal. 4,697,885, Cl. 350-334.000.

Miree, Mallory F. Apparatus for mounting flashlights to bicycles. 4,697,725, Cl. 224-41.000.

Mishima, Fumiyuki: *See*—
Takenoya, Hideaki; and Mishima, Fumiyuki, 4,697,941, Cl. 400-185.000.

Misumi, Shunjiro: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Mita Industrial Co., Ltd.: *See*—
Kajita, Hiroshi; Ujino, Koji; and Uehara, Yoshiyuki, 4,697,911, Cl. 355-3.0SH.

Mita, Seiichi: *See*—
Eto, Yoshizumi; Umemoto, Masuo; Kanada, Hidehiro; and Mita, Seiichi, 4,698,811, Cl. 371-38.000.

Mitani, Tadayuki; Endo, Mamoru; and Hiramoto, Takashi, to Daicel Chemical Industries, Ltd. Process for producing glyoxylic acid. 4,698,441, Cl. 562-531.000.

Mitchell, Brian, to Amphenol Corporation. Grommet for connectors. 4,697,861, Cl. 439-271.000.

Mitchell, Thomas O., to Mobil Oil Corporation. Enhanced recovery of hydrocarbonaceous fluids oil shale. 4,698,149, Cl. 208-428.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Aramaki, Jun; Karashima, Toshiharu; Magara, Takuji; and Ushida, Minoru, 4,698,477, Cl. 219-69.00R.
Niwa, Tomomitsu, 4,698,573, Cl. 318-571.000.
Ootsuka, Shigeharu; and Mizuno, Yuji, 4,698,726, Cl. 361-335.000.
Yamamoto, Masahiro; and Yatomi, Takeshi, 4,698,476, Cl. 219-69.00W.
Yuyama, Hiroshi, 4,697,434, Cl. 62-238.700.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mouri, Yasushi; and Kobayashi, Masanori, 4,697,987, Cl. 416-204.00A.

Nishizawa, Shun-ichi; Tsubota, Toshio; and Chikura, Takashi, 4,698,568, Cl. 318-481.000.

Mitsubishi Monsanto Chemical Co.: *See*—
Okumura, Tsuguo; Yamagishi, Naomichi; Abe, Kazuharu; Sugiyama, Masayoshi; and Mori, Kenji, 4,698,195, Cl. 264-235.800.

Mitsubishi Petrochemical Co., Ltd.: *See*—
Inoue, Takayuki; Hattori, Masafumi; Hayama, Kazuhide; and Maruta, Riichiro, 4,698,395, Cl. 525-327.800.

Mitsubishi Yuka Badische Co., Ltd.: *See*—
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.

Mitsuhashi, Tsuneyoshi: *See*—
Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mouri, Yasushi; and Kobayashi, Masanori, 4,697,987, Cl. 416-204.00A.

Mitsuishi, Tsutomu: *See*—
Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, 4,698,646, Cl. 346-76.0PH.

Mitsutake, Katsuharu, to Toyo Tire & Rubber Company Limited. Pneumatic tire tread. 4,697,627, Cl. 152-209.00R.

Miwa, Kishio; Nagaoka, Yukiko; and Inoue, Takehisa, to Toray Industries, Inc. Process for separation of substituted benzene isomers. 4,698,453, Cl. 585-828.000.

Miyakawa, Akira: *See*—
Nishimuro, Yoshiaki; Hirata, Osamu; Kano, Kuniomi; Miyakawa, Akira; Fushimoto, Hideo; and Sekine, Kazumi, 4,698,783, Cl. 364-710.000.

Miyake, Izumi, to Fuji Photo Film Co., Ltd. Playback apparatus for rotary recording medium. 4,698,702, Cl. 360-33.100.

Miyamoto, Kazuhiro: *See*—
Inoue, Atsuo; Miyamoto, Kazuhiro; Hisada, Nobuo; and Okinaga, Nobuyuki, 4,698,105, Cl. 149-2.000.

Miyamoto, Shoji: *See*—
Mori, Kinji; Miyamoto, Shoji; and Ihara, Hirokazu, 4,698,629, Cl. 340-825.050.

Miyata, Masanori: *See*—
Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, 4,697,916, Cl. 355-14.00E.

Miyazaki, Masaru: *See*—
Kohata, Toshihide; Miyazaki, Masaru; Sato, Yoshihisa; and Ikeda, Junichi, 4,697,408, Cl. 57-264.000.

Mizuno Corporation: *See*—
Hayashi, Keijiro; Shinya, Kenzo; Saeki, Yasuo; and Asai, Shigeru, 4,697,820, Cl. 280-609.000.
Hayashi, Keijiro; Shinya, Kenzo; Awano, Toshimi; and Asai, Shigeru, 4,697,821, Cl. 280-609.000.

Mizuno, Tooru: *See*—
Toyoda, Kenichi; Sakakibara, Shinsuke; Mizuno, Tooru; and Hara, Ryuichi, 4,698,777, Cl. 364-513.000.

Mizuno, Yuji: *See*—
Ootsuka, Shigeharu; and Mizuno, Yuji, 4,698,726, Cl. 361-335.000.

Mizuta, Ken; and Kondo, Shiro, to Alps Electric Co., Ltd. Position control apparatus for automobile driver. 4,698,571, Cl. 318-568.000.

Mizutani, Yoshihisa, to Tokyo Shibaura Denki Kabushiki Kaisha. Stacked complementary metal oxide semiconductor inverter. 4,698,659, Cl. 357-42.000.

Moake, Gordon L.; and Milewits, Marvin, to PA Incorporated. Method and apparatus for measuring velocity of ferromagnetic tubing. 4,698,590, Cl. 324-160.000.

Mobay Corporation: *See*—
Shafer, Jimmie G., 4,698,362, Cl. 514-490.000.

Mobil Oil Corporation: *See*—
Andress, Harry J., Jr.; and Ashjian, Henry, 4,698,169, Cl. 252-49.600.
Dellinger, Thomas B., 4,697,651, Cl. 175-61.000.
Mitchell, Thomas O., 4,698,149, Cl. 208-428.000.
Silvey, Frank C., 4,698,138, Cl. 203-91.000.
Valyocsik, Ernest W., 4,698,217, Cl. 423-328.00C.

Mobley, Joseph G.; and Womble, David P., to Scientific Atlanta, Inc. FM demodulator system with threshold extension. 4,698,598, Cl. 329-134.000.

Mohan, Edwin R.: *See*—
Bernard, Thomas E.; Roth, Emile M; Mohan, Edwin R.; Sherwin, Gary W.; and Zomp, John M., 4,697,598, Cl. 128-731.000.

Mohn, Jurgen; and Heine, Wilhelm. Apparatus for filtering and separating flowing media. 4,698,154, Cl. 210-232.000.

Molex Incorporated: *See*—
Finney, James E.; and Brubaker, Weldon L., 4,697,340, Cl. 29-862.000.
Silbernagel, Raymond A.; and Funck, Gordon W., 4,698,025, Cl. 439-79.000.

Molyneux, David J.: *See*—
Brown, Ian C.; Hedge, Roger W.; and Molyneux, David J., 4,697,604, Cl. 131-296.000.

Mondek, Matthew H.; and Neal, Louis R., to Outboard Marine Corporation. Marine propulsion device crankshaft bearing arrangement. 4,697,556, Cl. 123-195.0HC.

Monolithic Memories, Inc.: *See*—
Tavana, Danesh; and Wong, Sing Y., 4,698,525, Cl. 307-456.000.

Monsanto Company: *See*—
Lee, Len F.; and Miller, Maria L., 4,698,093, Cl. 71-94.000.

Monsrud, Edwin M.: *See*—
Eastman, Robert A.; Rugland, Larry D.; and Monsrud, Edwin M., 4,697,665, Cl. 180-230.000.

Monteith, Robert C.; and Borgmann, Robert E., to Cincinnati Milacron Inc. Laser robot. 4,698,482, Cl. 219-121.0LV.

Moore, Gary W. Quick change towing hitch. 4,697,818, Cl. 280-415.00A.

Moore, M. Samuel, to Semco Instruments, Inc. Lightweight thermocouple assembly. 4,698,454, Cl. 136-233.000.

Moore, Stephen: *See*—
Jansons, Viktors; Gors, Heinrich C.; Moore, Stephen; Reamey, Robert H.; and Becker, Paul, 4,698,393, Cl. 525-242.000.

Moore, William H.; Weaver, Max A.; and Lum, Kin K., to Eastman Kodak Company. Magenta dye-donor element used in thermal dye transfer. 4,698,651, Cl. 503-227.000.

Moore, William H.: *See*—
Mandel, Alan F.; Eichler, Kenneth M.; Trosky, William J.; and Moore, William H., 4,698,780, Cl. 364-550.000.

Moorhead, Arthur J., to United States of America, Energy. Copper-silver-titanium filler metal for direct brazing of structural ceramics. 4,698,271, Cl. 428-621.000.

Moosbrugger, Dennis S.; DiFazio, Joseph; and Watson, David N., to Xebron Corporation. Edge-illuminated sign. 4,697,365, Cl. 40-546.000.

Morand, Philippe C.: *See*—
Vega, Jean F.; and Morand, Philippe C., 4,698,108, Cl. 149-21.000.

Moreland, Robert D., to Betz Laboratories, Inc. Detackification of adhesive materials contained in secondary fiber. 4,698,133, Cl. 162-5.000.

Morgan, Peter E. D., to Rockwell International Corporation. Production of oxy-metallo-organic polymer. 4,698,417, Cl. 528-395.000.

Mori, Fumio: *See*—
Inaba, Michihiko; Fujiwara, Tetsuo; Kanto, Masaharu; Ohtake, Yasuhisa; and Mori, Fumio, 4,698,545, Cl. 313-402.000.

Mori, Kenji: *See*—
Okumura, Tsuguo; Yamagishi, Naomichi; Abe, Kazuharu; Sugiyama, Masayoshi; and Mori, Kenji, 4,698,195, Cl. 264-235.800.

Mori, Kinji; Miyamoto, Shoji; and Ihara, Hirokazu, to Hitachi, Ltd. Method and apparatus for coordination among distributed subsystems. 4,698,629, Cl. 340-825.050.

Moriceau, Hubert: *See*—
Armand, Marie-Francoise; Daval, Jacques; Ferrand, Bernard; and Moriceau, Hubert, 4,698,281, Cl. 428-692.000.

Morimoto, Kunio: *See*—
Okazaki, Kenichi; Morimoto, Kunio; Sawano, Kazumi; and Aoki, Masami, 4,698,755, Cl. 364-519.000.

Morin, Francois, to Hydro Quebec. Method and ohmmeter for measuring very low electric resistances. 4,698,584, Cl. 324-62.000.

Morita, Kunihiko, to Nippon Thompson Co., Ltd. Fluid bearing assembly. 4,697,933, Cl. 384-12.000.

Moriya, Koichi; and Oshizawa, Hidekazu, to Diesel Kiki C., Ltd. Cruise control apparatus for vehicles. 4,698,762, Cl. 364-424.100.

Morner, Bengt O. J. S., to Autoliv Development Aktiebolag. Locking device for a band in a safety belt of a passive vehicle safety belt system. 4,697,826, Cl. 280-804.000.

Morozumi, Takurou: *See*—
Abe, Kunihiro; Matsumura, Yoshitake; and Morozumi, Takurou, 4,698,765, Cl. 364-431.040.

Morris, Gregory J. E.; and Newton, H. Gene, to Dow Chemical Company, The. Structural frame for an electrochemical cell. 4,698,143, Cl. 204-253.000.

Morrison, David G. Granular binding agent for pellets. 4,698,225, Cl. 426-96.000.

Mort, Joseph, to Xerox Corporation. Electrophotographic imaging members having a ground plane of hydrogenated amorphous silicon. 4,698,288, Cl. 430-58.000.

Morton Thiokol, Inc.: *See*—
Guilbault, Lawrence J.; and Ulman, Jeffrey A., 4,698,162, Cl. 210-710.000.
Krulik, Gerald, 4,698,124, Cl. 156-642.000.

Mosch, Karl E.: *See*—
Bringham, Richard L.; Gordon, Lucas S.; and Mosch, Karl E., 4,698,207, Cl. 422-46.000.

Moser, Peter: *See*—
Conrad, Ulrich; Grohn, Michael; and Moser, Peter, 4,697,423, Cl. 60-605.000.

Mosinski, David: *See*—
Henderson, Harold R.; and Mosinski, David, 4,697,791, Cl. 266-48.000.

Moss, Arthur Z., to Du Pont de Nemours, E. I., and Company. Microporous polymeric films and process for their manufacture. 4,698,372, Cl. 521-145.000.

Mossbrugger, Horst G.: *See*—
Drago, Gary A.; Baier, Walter F.; Lee, Francis C.; Mills, Ross N.; and Mossbrugger, Horst G., 4,698,644, Cl. 346-140.00R.

Mothersole, David S.: *See*—
Thompson, Robert R.; Mothersole, David S.; and MacGregor, Douglas B., 4,698,747, Cl. 364-200.000.

Motorola Computer Systems, Inc.: *See*—
Ng, Edward C.; and Casnovsky, William M., 4,698,782, Cl. 364-708.000.

Motorola, Inc.: *See*—
Berglund, Robert K.; Mautz, Karl E.; and Tyldesley, Roger, 4,698,128, Cl. 156-643.000.
Braun, Jeffrey J.; and Cook, Kenneth M., 4,698,582, Cl. 323-285.000.
Davis, Walter L., 4,698,790, Cl. 365-230.000.
Flannagan, Stephen T.; Reed, Paul A.; and Barnes, John, 4,698,788, Cl. 365-205.000.

Jobling, David T.; and Newton, Anthony D., 4,698,556, Cl. 315-371.000.
Miller, Ira; and Hanna, John E., 4,698,737, Cl. 363-63.000.
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.
Schultz, Warren J., 4,698,655, Cl. 357-23.400.
Thompson, Robert R.; Mothersole, David S.; and MacGregor, Douglas B., 4,698,747, Cl. 364-200.000.
Wilkie, Brian F.; Gallup, Michael; Suchyta, John; and Raghunathan, Kuppuswamy, 4,698,750, Cl. 364-200.000.
Wimmer, Martin A., 4,697,765, Cl. 244-152.000.

Motoyama, Takeo: *See*—
Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, 4,698,102, Cl. 148-2.000.

Mourey, Bruno: *See*—
Boulitrop, Francois; Chartier, Eric; Mourey, Bruno; and Le Berre, Serge, 4,697,331, Cl. 437-82.000.

Mouri, Yasushi: *See*—
Katayama, Kazuzo; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mouri, Yasushi; and Kobayashi, Masanori, 4,697,987, Cl. 416-204.00A.

Mousston, Roland: *See*—
Billet, Rene ; Mousston, Roland; and Bionaz, Jean, 4,697,417, Cl. 60-338.000.

Moveco System AB: *See*—
Bergstrand, Gunnar, 4,697,468, Cl. 74-105.000.

Mrenna, Stephen A.; and Whipple, Michael J., to Westinghouse Electric Corp. Circuit breaker with adjustable thermal trip unit. 4,698,606, Cl. 335-45.000.

Mueller, Max A.: *See*—
Davis, Steven S.; Mueller, Max A.; and Janecek, Kenneth F., 4,697,511, Cl. 100-37.000.

Muench, George J.: *See*—
Crane, Jacob; Muench, George J.; Saleh, Yousef; and Lin, Lifun, 4,698,140, Cl. 204-146.000.

Muhle, Manfred. Method for manufacturing thermo-insulated compound profiles for windows, doors and facades. 4,697,337, Cl. 29-796.000.

Mukherjee, Satyen; and Chang, Thomas, to Exel Microelectronics, Inc. Single transistor electrically programmable memory device and method. 4,698,787, Cl. 365-185.000.

Muller, Hans, to Grapha-Holding AG. Perfect binder. 4,697,971, Cl. 412-33.000.

Muller, Hartwig; Hellwig, Claus; and Beyer, Dietmar, to VEB Kombinat Textima. Synchronizing device for the selection of knitting needles in knitting machines. 4,697,438, Cl. 66-75.200.

Muller, Horst, to Ciba-Geigy Corporation. Mixtures of organo-tin compounds. 4,698,368, Cl. 521-93.000.

Muller, Rolf, to Papst-Motoren GmbH & Co. K.G. Brushless direct current motor system. 4,698,542, Cl. 310-67.00R.

Muller, Warren E., to Charles Ross & Son Company. Planetary mixers. 4,697,929, Cl. 366-97.000.

Mullersman, Ferdinand H.; and McClelland, Mark E., to Gates Energy Products. Circuit for supplying energy from a battery to an energy-using device. 4,698,578, Cl. 320-13.000.

Mulligan, William L., to Parks-Cramer Company. Traveling cleaner system. 4,697,298, Cl. 15-312.00R.

Mumford, George V., to Owens-Illinois, Inc. Closures with cast sealing gasket. 4,697,716, Cl. 215-352.000.

Munchmeyer, Dietrich: *See*—
Ehrfeld, Wolfgang; Maner, Asim; and Munchmeyer, Dietrich, 4,698,285, Cl. 430-5.000.

Munksgaard, Christian: *See*—
Asmussen, Erik; and Munksgaard, Christian, 4,698,376, Cl. 523-115.000.

Munter, Ernst A., to Northern Telecom Limited. Method and apparatus for the channelized serial transmission of redundantly encoded binary data. 4,698,809, Cl. 371-30.000.

Munzenbrock, Anton: *See*—
Behnke, Klaus; and Munzenbrock, Anton, 4,698,565, Cl. 318-318.000.

Murai, Toshimi: *See*—
Sawada, Hiroshi; and Murai, Toshimi, 4,697,567, Cl. 123-489.000.

Muraji, Kenji: *See*—
Goto, Teruo; Takata, Yoshirou; Muraji, Kenji; and Higashi, Mikio, 4,698,622, Cl. 340-648.000.

Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, to Kawasaki Steel Corp. Apparatus for monitoring burden distribution in furnace. 4,697,453, Cl. 73-290.00R.

Murata Manufacturing Co., Ltd.: *See*—
Imamura, Eiji; Kumokawa, Takashi; Nakayama, Fumio; Mandai, Haruhumi; Fukutani, Iwao; and Tomono, Kunisaburo, 4,698,605, Cl. 333-184.000.
Kuze, Saburo; Kato, Yoshiharu; and Kojima, Shozo, 4,698,192, Cl. 264-101.000.

Murayama, Noboru: *See*—
Ito, Masahiro; Murayama, Noboru; Suziku, Koichi; Sato, Kei; and Sato, Tsutomu, 4,698,778, Cl. 364-518.000.
Suzuki, Koichi; Murayama, Noboru; Ito, Masahiro; and Sato, Kei, 4,698,691, Cl. 358-283.000.

Murayama, Yasushi: *See*—
Hayashi, Kimiyoshi; Ohno, Akio; Hirooka, Kazuhiko; and Murayama, Yasushi, 4,697,915, Cl. 355-14.00D.

Murdock, Bruce: *See*—
Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,698,460, Cl. 178-19.000.
Meadows, Robert D.; Krein, Philip T.; and Murdock, Bruce, 4,698,461, Cl. 178-19.000.

Muroi, Katsumi; Hiratsuka, Kosai; Yoshinaga, Shoji; Nakatsui, Toji; Oda, Chikao; and Fujiwara, Kiyoshi, to Hitachi, Ltd. Free-flow electrophoretic separation method and apparatus therefor. 4,698,142, Cl. 204-182.300.

Muroi, Kunimasa, to Nippon Gakki Seizo Kabushiki Kaisha. Racket and weight attachment. 4,697,811, Cl. 273-73.00C.

Murphy, Franklin J.: *See*—
Gonzalez, Avelino J.; Murphy, Franklin J.; Emery, Franklin T.; Weyant, Perry A.; and Craig, William G., 4,698,756, Cl. 364-557.000.

Murphy, Thomas A.: *See*—
MacDougall, Frederick W.; and Murphy, Thomas A., 4,698,725, Cl. 361-272.000.

Murray, Lee J.; and Schaefer, Suzanne E., to American Can Company. Multiple layer sheet material. 4,698,247, Cl. 428-35.000.

Musser, John H.; and Brown, Richard E., to USV Pharmaceutical Corporation. Thiazolo[5,4-h]quinoline compounds useful as anti-allergy agents. 4,698,346, Cl. 514-293.000.

Mutz, Dieter: *See*—
Angerstein, Jorg; Mutz, Dieter; and Wagner, Elmar, 4,697,880, Cl. 350-247.000.

MWB Messwandler-Bau Aktiengesellschaft: *See*—
Graul, Otto; and Oppelt, Herbert, 4,697,752, Cl. 242-7.110.

Myers, Paul: *See*—
Faber, Joseph; and Myers, Paul, 4,697,680, Cl. 192-86.000.

Myerson, Allan S.; and Ernst, William R., to Georgia Tech Research Corporation. Regeneration of HDS catalysts. 4,698,321, Cl. 502-25.000.

Nabisco Brands: *See*—
Straka, Robert; Ross, Edgar; and Vanderveer, Fred, 4,698,228, Cl. 426-446.000.

Nabisco Brands, Inc.: *See*—
Ramnarine, Wayne D., 4,698,004, Cl. 425-131.100.
Thulin, Robert; Ross, Robert E.; and Polifroni, Nicholas, 4,698,000, Cl. 425-133.100.

Nagai, Norimichi; Horiishi, Nanao; Kiyama, Masao; and Takada, Toshio, to Toda Kogyo Corp. Hexagonal plate-like barium ferrite particles for magnetic recording and process for producing the same. 4,698,182, Cl. 252-62.590.

Nagai, Yoriko: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Nagaki, Hideyoshi: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Nagaoka, Yukiko: *See*—
Miwa, Kishio; Nagaoka, Yukiko; and Inoue, Takehisa, 4,698,453, Cl. 585-828.000.

Nagarajan, Ramakrishnan; and Schabel, Amelia A., to Eli Lilly and Company. Novel glycopeptide derivatives. 4,698,327, Cl. 514-8.000.

Nagasaki, Kousuke, to Kabushiki Kaisha Irifune. Apparatus for preparation of a processing food. 4,697,507, Cl. 99-483.000.

Nagasaki, Kunikazu: *See*—
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.

Nagasawa, Kazumasa: *See*—
Shibata, Takeo; and Nagasawa, Kazumasa, 4,698,190, Cl. 264-40.200.

Nagel, Dietmar: *See*—
Kennedy, Melvin R.; Nagel, Dietmar; and Arad, Abraham A., 4,698,044, Cl. 446-434.000.

Naito, Kaoru: *See*—
Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, 4,698,646, Cl. 346-76.0PH.

Nakada, Akiyoshi: *See*—
Tada, Haruo; and Nakada, Akiyoshi, 4,697,978, Cl. 414-729.000.

Nakagawa, Yusuke: *See*—
Amatsu, Masashi; Yanase, Takeyasu; Inoue, Hiroshi; and Nakagawa, Yusuke, 4,698,786, Cl. 365-39.000.

Nakagima, Masashi; Kojima, Hiroshi; Matsui, Tatsuro; and Dokoshi, Noriaki, to Toray Thiokol Company Limited. One-pack curing type composition. 4,698,407, Cl. 528-14.000.

Nakahara, Moriya, to Kabushiki Kaisha Toshiba. Method of manufacturing a semiconductor device using amorphous silicon as a mask. 4,697,333, Cl. 437-20.000.

Nakahara, Yutaka: *See*—
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,698,381, Cl. 524-100.000.

Nakai, Kimimoto; and Umezaki, Isao, to Shibuya Kogyo Co., Ltd. Apparatus for treating athlete's foot. 4,697,590, Cl. 128-396.000.

Nakajima, Etsuro: *See*—
Okuyama, Masayoshi; Kido, Yukio; Mimura, Isao; and Nakajima, Etsuro, 4,697,931, Cl. 368-223.000.

Nakamura, Michiei; Takeuchi, Hitoshi; Takahashi, Tetujiro; Takizawa, Minoru; and Horiguchi, Shojiro, to Dainichiseika Color & Chemicals MFG. Co., Ltd. Pigment composition. 4,698,099, Cl. 106-288.00R.

Nakamura, Nobuo: *See*—
Matsuzaka, Kenzo; Okano, Seitaro; and Nakamura, Nobuo, 4,698,089, Cl. 65-290.000.
Nakamura, Shinichi: *See*—
Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, 4,697,916, Cl. 355-14.00E.
Nakamura, Takashi; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Phosphor, radiation image recording and reproducing method and radiation image storage panel. 4,698,508, Cl. 250-484.100.
Nakamura, Yuichi: *See*—
Sugawara, Masayoshi; Nakamura, Yuichi; and Matsui, Akira, 4,697,466, Cl. 74-27.000.
Nakanishi, Koichi; Onaka, Toshio; and Inoue, Takashi, to Kirin Beer Kabushiki Kaisha. Production of alcoholic beverages. 4,698,224, Cl. 426-11.000.
Nakanishi, Toshihiro: *See*—
Honda, Tadashi; and Nakanishi, Toshihiro, 4,698,423, Cl. 536-24.000.
Nakano, Atsushi: *See*—
Fukuda, Yasutaka; Shimizu, Shigeo; and Nakano, Atsushi, 4,698,251, Cl. 428-64.000.
Nakano, Yoshiyuki: *See*—
Machida, Kiyosada; Nakano, Yoshiyuki; and Matsukawa, Nobuo, 4,697,909, Cl. 354-484.000.
Nakase, Koji; and Sasaki, Hiroaki, to Alps Electric Co., Ltd. Optical code reader. 4,698,490, Cl. 235-472.000.
Nakashima, Seiichiro; Toyoda, Kenichi; Sakakibara, Shinsuke; and Torii, Nobutoshi, to Fanuc Ltd. Robot system safety method. 4,697,979, Cl. 414-786.000.
Nakatsui, Toji: *See*—
Muroi, Katsumi; Hiratsuka, Kosai; Yoshinaga, Shoji; Nakatsui, Toji; Oda, Chikao; and Fujiwara, Kiyoshi, 4,698,142, Cl. 204-182.300.
Nakatsukasa, Walter M.: *See*—
Mabe, James A.; and Nakatsukasa, Walter M., 4,698,307, Cl. 435-253.000.
Nakaya, Keiichi; Tanaka, Kunio; Kanno, Fukuo; and Kobayashi, Mitaka, to Asahi Glass Company Ltd. Magnesium hydroxide, process for its production and resin composition containing it. 4,698,379, Cl. 523-513.000.
Nakaya, Tsutomu; and Maruyama, Masayoshi, to Okashiro Sangyo Kabushiki Kaisha. Sleeve to be attached to the reel on a winding or rewinding machine. 4,697,757, Cl. 242-68.500.
Nakayama, Fumio: *See*—
Imamura, Eiji; Kumokawa, Takashi; Nakayama, Fumio; Mandai, Haruhumi; Fukutani, Iwao; and Tomono, Kunisaburo, 4,698,605, Cl. 333-184.000.
Nakayama, Hiroki: *See*—
Sato, Yasuhisa; Yamada, Yasuyuki; Nakayama, Hiroki; and Oizumi, Kouji, 4,697,882, Cl. 350-287.000.
Nakayama, Kazutaka: *See*—
Minowa, Toshio; Hashimoto, Tetsuro; Kuroda, Kohji; and Nakayama, Kazutaka, 4,697,885, Cl. 350-334.000.
Nakayama, Masaharu: *See*—
Ohmura, Hiroshi; Oshibe, Yoshihiro; Nakayama, Masaharu; and Yamamoto, Takashi, 4,698,388, Cl. 525-88.000.
Nakayama, Shigenori: *See*—
Yoshikawa, Seiji; Sato, Isao; Nakayama, Shigenori; and Amazaki, Mitsuhiro, 4,697,498, Cl. 91-420.000.
Nalco Chemical Company: *See*—
Cramm, Jeffrey R.; and Bailey, Kristy M., 4,698,404, Cl. 526-204.000.
Namiki, Yasuomi: *See*—
Ishigaki, Yukinobu; Namiki, Yasuomi; Fujiwara, Hisashige; and Hirohashi, Kazutoshi, 4,698,693, Cl. 358-310.000.
Nara, Takashi: *See*—
Hatano, Takashi; Nara, Takashi; Kawato, Yutaka; and Okada, Sumie, 4,698,801, Cl. 370-58.000.
Narishige, Shinji: *See*—
Komuro, Matahiro; Kozono, Yuzo; Yasuda, Takeshi; Narishige, Shinji; Hanazono, Masanobu; and Kuroda, Tetsuro, 4,698,273, Cl. 428-635.000.
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, to Toyama Chemical Co., Ltd. 4-oxo-1,4-dihydronicotinic acid derivatives, salts thereof, and antibacterial agents containing the same. 4,698,352, Cl. 514-339.000.
Narusch, Michael J., Jr.; and LeBail, Stanley G. Sintered, corrosion-resistant powdered metal product and its manufacture. 4,698,269, Cl. 428-552.000.
Nath, Prem: *See*—
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi C.; Fournier, Jeffrey; and Kulman, James, 4,698,234, Cl. 427-39.000.
National Distillers and Chemical Corporation: *See*—
Mertz, William J.; and O'Brien, William L., 4,698,383, Cl. 524-314.000.
National Nuclear Corporation Limited: *See*—
Chesworth, Graham; and Aspden, Garth J., 4,698,199, Cl. 376-206.000.
National Research Development Corporation: *See*—
Anderson, Joseph C., 4,698,235, Cl. 427-42.000.
Ashcroft, Andrew J., 4,697,616, Cl. 137-486.000.
Sansome, Dennis H.; and Jones, Gerald M., 4,697,447, Cl. 72-283.000.
National Semiconductor Corporation: *See*—
Balakrishnan, Ramanatha V., 4,697,858, Cl. 439-61.000.
Thomson, Peter K., 4,698,530, Cl. 307-571.000.
National Starch and Chemical Corporation: *See*—
Salerno, Catherine E., 4,698,242, Cl. 427-208.200.
Natsugari, Hideaki: *See*—
Yoshioka, Koichi; Tamura, Norikazu; and Natsugari, Hideaki, 4,698,339, Cl. 514-210.000.
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Naucho Proizvodsvena Laboratoria za Dvigateli s Vatreshno Gorene: *See*—
Kolev, Nikola T., 4,697,552, Cl. 123-56.0BC.
Naudin, Jacky, to Valeo. Clutch cover assembly. 4,697,679, Cl. 192-70.180.
Nava & C. S.p.A.: *See*—
Luigi, Nava P., 4,697,289, Cl. 2-422.000.
NCM International, Inc.: *See*—
Gradecki, Raymond J.; McLaughlin, James M.; and Sorensen, Gerald R., 4,697,710, Cl. 211-45.000.
NCR Corporation: *See*—
Heys, George, Jr.; Aleshire, Rex A.; and Sampson, Harold J., 4,698,707, Cl. 360-99.000.
Peebles, John A.; and Swinton, James D., 4,697,944, Cl. 400-635.000.
Neal, Louis R.: *See*—
Mondek, Matthew H.; and Neal, Louis R., 4,697,556, Cl. 123-195.0HC.
Neal, William F.: *See*—
Brown, Wayne M.; Neal, William F.; and Schwarz, Frederick M., 4,697,981, Cl. 415-104.000.
NEC Corporation: *See*—
Kajiwara, Yuji, 4,698,495, Cl. 250-211.00R.
Kamata, Takao, 4,698,656, Cl. 357-24.000.
Matsumoto, Kouji, 4,698,527, Cl. 307-475.000.
Terakado, Tomoji; and Odagiri, Yuichi, 4,698,821, Cl. 372-50.000.
Tohya, Hirokazu; and Kido, Tooru, 4,698,517, Cl. 307-43.000.
Nederlandse Industriele Maatschappij Nefit B.V.: *See*—
Pelleboer, Nicolaas, 4,697,787, Cl. 251-315.000.
Neer, Robert M.; Potts, John T., Jr.; and Slovik, David M., to General Hospital Corporation, The. Method of increasing bone mass. 4,698,328, Cl. 514-12.000.
Negi, Shigeto: *See*—
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, 4,698,336, Cl. 514-202.000.
Nelson Industries Inc.: *See*—
Barker, Irvy T., 4,697,668, Cl. 181-262.000.
Nelson, John L., Jr.: *See*—
Marlow, Raymond; and Nelson, John L., Jr., 4,698,636, Cl. 342-104.000.
Nelson, Thomas L., to Du Pont de Nemours, E. I., and Company. Process for the production of twist-free novelty nub yarns. 4,697,317, Cl. 28-258.000.
Nemoto, Sadao: *See*—
Takeuchi, Mamoru; Nemoto, Sadao; Suzuki, Shizuo; and Kawai, Juichiro, 4,697,984, Cl. 415-142.000.
Nepault, Bernard. Collector cup for collecting dental amalgam. 4,698,018, Cl. 433-25.000.
Nestor, John J.; and Vickery, Brian H., to Syntex (U.S.A.) Inc. ω-Guanidino-substituted-α-amino acids. 4,698,442, Cl. 562-560.000.
Neumann, Frank D.: *See*—
Hardy, Richard; Neumann, Frank D.; and Ruzicka, Dennis E., 4,697,764, Cl. 244-137.400.
Nevin, Donald M., to Buffalo Dental Manufacturing Co., Inc. Method for disinfecting dental impressions. 4,698,206, Cl. 422-24.000.
Newell, Chester W.: *See*—
Henderson, James J.; and Newell, Chester W., 4,697,759, Cl. 242-179.000.
Newman, Robert L.: *See*—
Welch, Richard E.; and Newman, Robert L., 4,698,614, Cl. 338-22.00R.
Newmark, Larry J.: *See*—
Hibbert, David A.; and Newmark, Larry J., 4,698,727, Cl. 361-356.000.
Newton, Anthony D.: *See*—
Jobling, David T.; and Newton, Anthony D., 4,698,556, Cl. 315-371.000.
Newton, H. Gene: *See*—
Morris, Gregory J. E.; and Newton, H. Gene, 4,698,143, Cl. 204-253.000.
Ng, Edward C.; and Casnovsky, William M., to Motorola Computer Systems, Inc. Electronic workstation with parkable keyboard. 4,698,782, Cl. 364-708.000.
Ng, Sheau-Bao: *See*—
Lewis, Henry G., Jr.; and Ng, Sheau-Bao, 4,698,680, Cl. 358-166.000.
Ngai, Peter Y. Y., to Peerless Lighting Corporation. Lensed indirect luminaire with side angle brightness control. 4,698,734, Cl. 362-225.000.

NHK Spring Co., Ltd.: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.
Nicholas, Beatrice M.: *See*—
Gray, George W.; and Nicholas, Beatrice M., 4,698,176, Cl. 252-299.610.
Nicholas, James W.: *See*—
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,697,718, Cl. 220-82.00R.
Nichols, William E.; Herzog, William F.; Feldman, Neil; and Laumeister, William, to Apert-Herzog Corporation. Audio-visual monitoring system. 4,698,664, Cl. 358-10.000.
Niddam, Roger: *See*—
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,697,574, Cl. 128-1.00D.
Niederer, Roland R.; and Zulliger, Hans W., to Cilag, AG. Medicated suppository. 4,698,359, Cl. 514-396.000.
Niemi, Riitta: *See*—
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Nifco Inc.: *See*—
Fukuda, Moritoshi, 4,697,948, Cl. 403-71.000.
Omata, Nobuaki, 4,697,673, Cl. 188-291.000.
Niggemann, Richard E.; and Ellis, Wilbert E., to Sundstrand Corporation. Forced flow evaporator for unusual gravity conditions. 4,697,427, Cl. 62-119.000.
Niikura, Masakatsu: *See*—
Otobe, Yutaka; Niikura, Masakatsu; and Wazaki, Yoshio, 4,697,421, Cl. 60-602.000.
Nijman, Johan M.: *See*—
Hoogendoorn, Thomas M.; de Haas, Maarten A.; and Nijman, Johan M., 4,698,103, Cl. 148-12.00F.
Nilssen, Ole K. Electronic power supply system. 4,698,553, Cl. 315-200.00R.
Nilsson, Eric: *See*—
Alklind, Lars E.; and Nilsson, Eric, 4,697,290, Cl. 5-61.000.
Nimura, Hitoshi: *See*—
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Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Komatsu, Hirotake, 4,698,797, Cl. 369-116.000.
Muroi, Kunimasa, 4,697,811, Cl. 273-73.00C.
Nippon Kayaku Kabushiki Kaisha: *See*—
Inoue, Atsuo; Miyamoto, Kazuhiro; Hisada, Nobuo; and Okinaga, Nobuyuki, 4,698,105, Cl. 149-2.000.
Nippon Kogaku K. K.: *See*—
Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, 4,698,646, Cl. 346-76.0PH.
Wakabayashi, Hiroshi; Kazami, Kazuyuki; and Uchida, Isao, 4,697,898, Cl. 354-127.130.
Wakabayashi, Hiroshi; and Wakamiya, Koichi, 4,697,901, Cl. 354-221.000.
Nippon Kogaku K.K.: *See*—
Machida, Kiyosada; Nakano, Yoshiyuki; and Matsukawa, Nobuo, 4,697,909, Cl. 354-484.000.
Terui, Nobuhiko; and Hagiuda, Nobuyoshi, 4,697,907, Cl. 354-416.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Tsuchimoto, Yoshihiro; and Takesa, Kazuhiko, 4,697,615, Cl. 137-340.000.
Nippon Light Metal Company Limited: *See*—
Ohira, Shigeo; and Iwaki, Masaya, 4,698,233, Cl. 427-38.000.
Nippon Oil Company, Ltd.: *See*—
Toya, Tomohiro; Hara, Hajime; Iida, Shigeki; and Satoh, Tetsuo, 4,698,397, Cl. 525-437.000.
Nippon Oil & Fats Co.: *See*—
Ohmura, Hiroshi; Oshibe, Yoshihiro; Nakayama, Masaharu; and Yamamoto, Takashi, 4,698,388, Cl. 525-88.000.
Nippon Oil and Fats Co., Ltd.: *See*—
Ikeda, Toshiki; Beppu, Yoshitugu; Yamamoto, Takashi, Ishigaki, Hideyo; and Ohmura, Hiroshi, 4,698,367, Cl. 521-57.000.
Nippon Rehabili-Medical Corporation: *See*—
Terauchi, Ryugo, 4,697,580, Cl. 128-36.000.
Nippon Steel Corporation: *See*—
Fujii, Masahiro; Kamada, Minoru; and Matsubara, Shigeharu, 4,698,158, Cl. 210-610.000.
Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, 4,698,102, Cl. 148-2.000.
Yamamoto, Yoshun; Okubo, Hitoshi; Watanabe, Yutaka; Uchiyama, Eizo; and Yasunaga, Yutaka, 4,697,446, Cl. 72-178.000.
Nippon Thompson Co., Ltd.: *See*—
Morita, Kunihiko, 4,697,933, Cl. 384-12.000.
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Nippondenso Co., Ltd.: *See*—
Suzuki, Yasutoshi; Itoh, Hiroshi; Ohmi, Shinya; and Hara, Kunihiko, 4,697,883, Cl. 350-331.00R.
Tsukahara, Kengi; Matsui, Kazuma; Abe, Taizoh; and Suzuki, Masahiko, 4,697,991, Cl. 417-219.000.
Nishiguchi, Yasuo; Yasutomi, Tsuyoshi; and Shiraishi, Ryoichi, to Kyocera Corporation. Serial type thermal head. 4,698,643, Cl. 346-76.0PH.
Nishikawa, Masumi: *See*—
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, 4,698,838, Cl. 379-58.000.
Nishikawa, Shigeo: *See*—
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.
Nishimori, Shinji, to Ebara Corporation. Grinder pump. 4,697,746, Cl. 241-46.00B.
Nishimura, Kazuhisa; Yoshihiro, Mitsugu; Sakai, Masaaki; and Hataoka, Seiichi, to Sony Corporation. Capstan servo system. 4,698,703, Cl. 360-73.000.
Nishimura, Sadanori; and Sekine, Noboru, to Honda Giken Kogyo Kabushiki Kaisha. Controller for vehicle transmission with auxiliary transmission. 4,697,475, Cl. 74-866.000.
Nishimura, Tomoaki: *See*—
Shiraki, Manabu; Amano, Hiroyuki; Nishimura, Tomoaki; and Shimizu, Katsumasa, 4,698,535, Cl. 310-156.000.
Nishimuro, Yoshiaki; Hirata, Osamu; Kano, Kuniomi; Miyakawa, Akira; Fushimoto, Hideo; and Sekine, Kazumi, to Canon Kabushiki Kaisha. Electronic equipment calendar and random daily message generator. 4,698,783, Cl. 364-710.000.
Nishiura, Masaharu: *See*—
Kato, Toshiaki; Ueno, Masakazu; and Nishiura, Masaharu, 4,698,494, Cl. 250-211.00R.
Nishizawa, Shun-ichi; Tsubota, Toshio; and Chikura, Takashi, to Mitsubishi Jukogyo Kabushiki Kaisha. Antiexplosion structure in a working robot. 4,698,568, Cl. 318-481.000.
Nissan Motor Co., Ltd.: *See*—
Hiramoto, Yukio, 4,698,828, Cl. 377-3.000.
Kobayashi, Toshio, 4,697,297, Cl. 15-250.230.
Ueno, Takashi; and Abo, Toshimi, 4,697,422, Cl. 60-602.000.
Nissenbaum, Benjamin: *See*—
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Nite-Striker Company, Inc., The: *See*—
Mills, Kenneth L., 4,697,375, Cl. 43-17.500.
Nitta, Jun: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.
Nitto Boseki Co., Ltd.: *See*—
Shioura, Kozo; Yamazaki, Syuichi; and Shono, Hiroaki, 4,698,083, Cl. 65-2.000.
Niwa, Tomomitsu, to Mitsubishi Denki Kabushiki Kaisha. Numerically controlled working process. 4,698,573, Cl. 318-571.000.
Nixdorf Computer AG: *See*—
Ihlenburg, Rainer; Baitz, Guenter; and Nixdorf, Heinz, 4,698,709, Cl. 360-104.000.
Nixdorf, Heinz: *See*—
Ihlenburg, Rainer; Baitz, Guenter; and Nixdorf, Heinz, 4,698,709, Cl. 360-104.000.
NL Industries, Inc.: *See*—
Fontenot, John E., 4,697,650, Cl. 175-50.000.
Paske, William C., 4,698,501, Cl. 250-265.000.
NL Petroleum Products Limited: *See*—
Barr, John D.; and Taylor, Malcolm R., 4,697,654, Cl. 175-329.000.
Noda, Satoko; and Susumu, Matsui, to Takara Shuzo Co., Ltd. Process for producing peroxidase. 4,698,306, Cl. 435-192.000.
Noda, Shoji: *See*—
Kamigaito, Osami; Doi, Haruo; and Noda, Shoji, 4,697,325, Cl. 29-447.000.
Nolan, Joseph G., III: *See*—
Blankenship, Timothy L.; and Nolan, Joseph G., III, 4,698,589, Cl. 324-158.00R.
Nollen, Klaus: *See*—
Burow, Wilfried; Printzen, Helmut; Brunn, Horst; and Nollen, Klaus, 4,698,100, Cl. 106-304.000.
Noma, Takeshi: *See*—
Wada, Minoru; Hidaka, Chikara; and Noma, Takeshi, 4,697,744, Cl. 241-20.000.
Nomoto, Seiichiro: *See*—
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, 4,698,336, Cl. 514-202.000.
Nomura, Makoto: *See*—
Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, 4,697,453, Cl. 73-290.00R.
Nomura, Setsuo; Kubozoe, Morioki; and Isakozawa, Shigeto, to Hitachi, Ltd. Focusing apparatus used in a transmission electron microscope. 4,698,503, Cl. 250-311.000.
Nonomura, Yutaka; Sugiyama, Jun; Komatsubara, Hirofumi; and Takeuchi, Masaharu, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Torque measuring apparatus. 4,697,459, Cl. 73-862.360.
Nordica S.p.A.: *See*—
Balbinot, Renzo, 4,697,359, Cl. 36-2.600.
Noren, Tore H., to Stero Company, The. Tray accumulator for soiled ware conveyor. 4,697,711, Cl. 211-182.000.
Noritake Co., Limited: *See*—
Minowa, Toshio; Hashimoto, Tetsuro; Kuroda, Kohji; and Nakayama, Kazutaka, 4,697,885, Cl. 350-334.000.
Norling, Brian L., to Sundstrand Data Control, Inc. Accelerometer coil mounting system. 4,697,455, Cl. 73-497.000.
Norris, Gary E.: *See*—
Wensel, Neil D.; Norris, Gary E.; and Beierwaltes, Craig G., 4,698,767, Cl. 364-471.000.

North American Philips Corporation: *See*—
Maresca, Robert L., 4,698,576, Cl. 318-687.000.
Mayo, William T., Jr., 4,697,594, Cl. 128-653.000.
Stupp, Edward H.; and Fellows, Mark W., 4,698,554, Cl. 315-307.000.
North American Specialties Corp.: *See*—
Seidler, Jack, 4,697,865, Cl. 439-861.000.
Northern Lights Trust of February 14, 1978: *See*—
Csongor, Desider G., 4,697,928, Cl. 366-80.000.
Northern Research & Engineering Corp.: *See*—
Brassert, Walter L.; and Heitmann, Arnold M., 4,697,520, Cl. 102-334.000.
Northern Telecom Limited: *See*—
Burley, Gregory S., 4,698,817, Cl. 372-31.000.
Graves, Alan F.; and Littlewood, Paul A., 4,698,806, Cl. 370-100.000.
Munter, Ernst A., 4,698,809, Cl. 371-30.000.
So, Vincent C.; Hughes, Richard P.; and Vella, Paul J., 4,697,869, Cl. 350-96.150.
Northrup, Ronnie; and Fay, Bernard, to Micronix Corporation. X-ray mask membrane deflection compensator and method. 4,698,834, Cl. 378-34.000.
Norvall, David: *See*—
Hubbins, Stephen J.; England, David G.; Szczepanek, Andre; and Norvall, David, 4,698,753, Cl. 364-200.000.
Nozaki, Hiroyoshi: *See*—
Kikuchi, Uhee; Nozaki, Hiroyoshi; Fukuda, Masao; and Satake, Toshihiko, 4,698,005, Cl. 425-163.000.
Nozaki, Shinya: *See*—
Kobayashi, Tadashi; and Nozaki, Shinya, 4,697,565, Cl. 123-449.000.
Nozick, Jacques E. Distribution frame for optical cables. 4,697,874, Cl. 350-96.230.
NRM Corporation: *See*—
Singh, Anand P., 4,698,003, Cl. 425-52.000.
Nugent, Adam, Jr.: *See*—
Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., 4,698,380, Cl. 524-2.000.
Nussbaumer, Manfred; Glaser, Eberhard; Beitinger, Eberhard; and Eckardt, Hartmann, to Ed. Zublin Aktiengesellschaft. Method and apparatus for subsequent underground sealing. 4,697,953, Cl. 405-128.000.
Nusser, Terry R.: *See*—
Goldstein, Alan J.; and Nusser, Terry R., 4,698,752, Cl. 364-200.000.
Nuttens, Hugo J. C.; and VanHaeren, Gerard, to Exxon Research & Engineering Co. Polyethylene wax. 4,698,450, Cl. 585-520.000.
Nutting, Robert G.: *See*—
Shelby, Richard K.; and Nutting, Robert G., 4,698,012, Cl. 425-526.000.
N.V. Lighttown Constructions: *See*—
Anthonijsz, Edwin M. C., 4,698,034, Cl. 440-27.000.
Nysen, Paul A.: *See*—
Kelly, Joseph L., Jr.; Howard, Mig A.; Nysen, Paul A.; and Hacking, Colin A., 4,698,631, Cl. 340-853.000.
Oba, Hiroki, to Alps Electric Co., Ltd. Switch. 4,698,465, Cl. 200-16.00F.
O'Brien, William L.: *See*—
Mertz, William J.; and O'Brien, William L., 4,698,383, Cl. 524-314.000.
Ochi, Hiroshi; Tetsutani, Nobuji; Yamamoto, Tetsuji; Kitani, Shigehisa; and Watanabe, Asao, to Canon Kabushiki Kaisha. Image processing system. 4,698,688, Cl. 358-257.000.
O'Connor, Robert G., to General Electric Co. Euro connector with space arrangement to permit mounting of male and female connectors. 4,698,029, Cl. 439-532.000.
Oda, Chikao: *See*—
Muroi, Katsumi; Hiratsuka, Kosai; Yoshinaga, Shoji; Nakatsui, Toji; Oda, Chikao; and Fujiwara, Kiyoshi, 4,698,142, Cl. 204-182.300.
Oda, Hajime: *See*—
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, 4,697,908, Cl. 354-439.000.
Odagiri, Yuichi: *See*—
Terakado, Tomoji; and Odagiri, Yuichi, 4,698,821, Cl. 372-50.000.
O'Dwyer, Jeremiah B.: *See*—
Byrne, John V.; and O'Dwyer, Jeremiah B., 4,698,537, Cl. 310-168.000.
Officina Meccanica della Stanga O.M.S. S.p.A.: *See*—
Vigliani, Umberto, 4,697,526, Cl. 105-3.000.
Officine Minnetti di Federico Minnetti & C.S.a.s.: *See*—
Minnetti, Federico, 4,697,690, Cl. 198-395.000.
Ogasawara, Sadanori; Hanafusa, Takashi; Kariya, Katsuhide; Ito, Masayoshi; and Shitori, Yoshiyasu, to Mect Corporation. Expectorant. 4,698,332, Cl. 514-42.000.
Ogawa, Kazufumi, to Matsushita Electric. Method of curing photocurable and heat-curable compositions and a method of adhering members to each other by using them. 4,698,113, Cl. 156-275.700.
Ogawa, Makoto: *See*—
Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, 4,698,646, Cl. 346-76.0PH.
Ogawa, Riichi: *See*—
Saito, Tadao; and Ogawa, Riichi, 4,697,722, Cl. 222-571.000.
Ogawa, Takahira: *See*—
Fukuda, Hideo; Ogawa, Takahira; and Fujii, Takao, 4,698,304, Cl. 435-166.000.
Ogawa, Toshio: *See*—
Ishihara, Joo; Ogawa, Toshio; Era, Masashi; and Sato, Ken-ichi, 4,697,320, Cl. 29-132.000.
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, to Seikosha Co., Ltd. Program shutter. 4,697,908, Cl. 354-439.000.
Ohara, Tsunemasa: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,697,899, Cl. 354-173.110.
Ohashi, Yasuo: *See*—
Tanaka, Haruma; and Ohashi, Yasuo, 4,697,445, Cl. 72-68.000.
Ohaus Scale Corporation: *See*—
Scheffer, Daniel G.; and Brock, Marilyn A., 4,697,658, Cl. 177-229.000.
Ohgami, Masaki; Yasuda, Hiroki; and Kubota, Masaharu, to Fuji Jukogyo Kabushiki Kaisha. Air-fuel ratio control system. 4,697,564, Cl. 123-440.000.
Ohira, Shigeo; and Iwaki, Masaya, to Nippon Light Metal Company Limited; and Rikagaku Kenkyusho. Production of aluminum material having an aluminum nitride layer. 4,698,233, Cl. 427-38.000.
Ohkubo, Katsuhiro: *See*—
Itani, Kiyoshi; Tokizaki, Hisashi; Funagoshi, Tomohide; Ohtsuka, Nobuo; Ohkubo, Katsuhiro; and Katsuki, Hikaru, 4,698,744, Cl. 364-140.000.
Ohman, Gerth, to Ergonomen HB. Clamp for holding rope fast. 4,697,314, Cl. 24-132.00R.
Ohmi, Shinya: *See*—
Suzuki, Yasutoshi; Itoh, Hiroshi; Ohmi, Shinya; and Hara, Kunihiko, 4,697,883, Cl. 350-331.00R.
Ohmura, Hiroshi; Oshibe, Yoshihiro; Nakayama, Masaharu; and Yamamoto, Takashi, to Nippon Oil & Fats Co. Method for modifying the surface of polymer materials. 4,698,388, Cl. 525-88.000.
Ohmura, Hiroshi: *See*—
Fujibayashi, Kazuo; Tsunekawa, Tokuichi; and Ohmura, Hiroshi, 4,697,905, Cl. 354-406.000.
Ikeda, Toshiki; Beppu, Yoshitugu; Yamamoto, Takashi; Ishigaki, Hideyo; and Ohmura, Hiroshi, 4,698,367, Cl. 521-57.000.
Ohnari, Mikihiko; Funabashi, Motohisa; Shioya, Makoto; Sekozawa, Teruji; and Shida, Masami, to Hitachi, Ltd. Method of controlling electronic fuel injection to internal combustion engine. 4,697,566, Cl. 123-479.000.
Ohno, Akio: *See*—
Hayashi, Kimiyoshi; Ohno, Akio; Hirooka, Kazuhiko; and Murayama, Yasushi, 4,697,915, Cl. 355-14.00D.
Ohno, John M., to General Electric Company. Cutting insert for interrupted heavy machining. 4,698,070, Cl. 51-307.000.
Ohotoshi, Sachio: *See*—
Ono, Yusuke; Ohotoshi, Sachio; and Yamauchi, Masaru, 4,698,240, Cl. 427-58.000.
Ohtaka, Keiji; Hiramatsu, Akira; Suda, Yasuo; Akashi, Akira; and Ishizaki, Akira, to Canon Kabushiki Kaisha. Focus detector system with a distortion compensation mask. 4,698,492, Cl. 250-201.000.
Ohtake, Yasuhisa: *See*—
Inaba, Michihiko; Fujiwara, Tetsuo; Kanto, Masaharu; Ohtake, Yasuhisa; and Mori, Fumio, 4,698,545, Cl. 313-402.000.
Ohtsuka, Nobuo: *See*—
Itani, Kiyoshi; Tokizaki, Hisashi; Funagoshi, Tomohide; Ohtsuka, Nobuo; Ohkubo, Katsuhiro; and Katsuki, Hikaru, 4,698,744, Cl. 364-140.000.
Ohtsuka, Shuichi: *See*—
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OI Forest Products STS Inc.: *See*—
Snyder, Teddy R., 4,697,731, Cl. 229-23.00R.
Oishi, Kengo, to Fuji Photo Film Co., Ltd. Magnetic recording disk having center core secured by a base-less double-sided adhesive tape. 4,698,715, Cl. 360-133.000.
Oizumi, Kouji: *See*—
Sato, Yasuhisa; Yamada, Yasuyuki; Nakayama, Hiroki; and Oizumi, Kouji, 4,697,882, Cl. 350-287.000.
Oka, Takafumi: *See*—
Fukuda, Yasushi; Oka, Takafumi; and Tanaka, Kazuo, 4,698,810, Cl. 371-38.000.
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, to Hitachi Construction Machinery Co., Ltd. Control system for hydraulically-operated construction machinery. 4,697,418, Cl. 60-434.000.
Okabe, Ryuichiro; and Yanagi, Yoshitaka, to Ajinomoto General Foods. Drip drink maker. 4,697,503, Cl. 99-306.000.
Okada, Shinjiro; and Tamura, Yasuyuki, to Canon Kabushiki Kaisha. Liquid crystal device and method for driving the same using ferroelectric liquid crystal and FET's. 4,697,887, Cl. 350-350.00S.
Okada, Sumie: *See*—
Hatano, Takashi; Nara, Takashi; Kawato, Yutaka; and Okada, Sumie, 4,698,801, Cl. 370-58.000.
Okada, Toshihiko: *See*—
Goto, Masao; Kimura, Haruo; Okada, Toshihiko; Yuasa, Katsunori; and Ito, Tetuzo, 4,697,708, Cl. 209-534.000.
Okada, Yasushi: *See*—
Hashimoto, Kenshiro; and Okada, Yasushi, 4,698,209, Cl. 422-88.000.
Okafuji, Takayuki: *See*—
Sakamoto, Hitoshi; and Okafuji, Takayuki, 4,698,699, Cl. 360-10.200.
Okamura, Shigeru, to Canon Kabushiki Kaisha. Apparatus for controlling motor speed. 4,698,566, Cl. 318-332.000.

Okano, Haruo: *See*—
Hayasaka, Nobuo; Okano, Haruo; and Horiike, Yasuhiro, 4,698,238, Cl. 427-53.100.
Okano, Seitaro: *See*—
Matsuzaka, Kenzo; Okano, Seitaro; and Nakamura, Nobuo, 4,698,089, Cl. 65-290.000.
Okano, Takashi, to Pioneer Video Corporation. Method and system for recording video information with a phase control operation by which a phase value of a recording RF signal of each 1H period is desirably adjusted. 4,698,697, Cl. 358-340.000.
Okashiro Sangyo Kabushiki Kaisha: *See*—
Nakaya, Tsutomu; and Maruyama, Masayoshi, 4,697,757, Cl. 242-68.500.
Okazaki, Kenichi; Morimoto, Kunio; Sawano, Kazumi; and Aoki, Masami, to Hitachi, Ltd. Printer control system and method of designating functions of printer. 4,698,755, Cl. 364-519.000.
Oki Electric Industry Co., Ltd.: *See*—
Goto, Masao; Kimura, Haruo; Okada, Toshihiko; Yuasa, Katsunori; and Ito, Tetuzo, 4,697,708, Cl. 209-534.000.
Okinaga, Nobuyuki: *See*—
Inoue, Atsuo; Miyamoto, Kazuhiro; Hisada, Nobuo; and Okinaga, Nobuyuki, 4,698,105, Cl. 149-2.000.
Oku, Teruo: *See*—
Kitaura, Yoshihiko; Oku, Teruo; Hirai, Hideo; Yamamoto, Tosiyuki; and Hashimoto, Masashi, 4,698,349, Cl. 514-306.000.
Okubo, Hitoshi: *See*—
Yamamoto, Yoshun; Okubo, Hitoshi; Watanabe, Yutaka; Uchiyama, Eizo; and Yasunaga, Yutaka, 4,697,446, Cl. 72-178.000.
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, to Shimizu Construction Co. Ltd.; and Kawasaki Steel Corporation. Trussed girder, roof framing using the trussed girder and method of constructing the roof framing of a building using the trussed girder. 4,697,397, Cl. 52-223.00R.
Okuhara, Hisakazu: *See*—
Sasaki, Kiichi; Tabata, Hiroshi; Okuhara, Hisakazu; and Higuchi, Kazuo, 4,697,827, Cl. 280-808.000.
Okumura, Tsuguo; Yamagishi, Naomichi; Abe, Kazuharu; Sugiyama, Masayoshi; and Mori, Kenji, to Mitsubishi Monsanto Chemical Co. Process for preparing biaxially drawn polyamide films. 4,698,195, Cl. 264-235.800.
Okuya, Tsutae, to Alps Electric Co., Ltd. Click mechanism of slide volume control. 4,698,613, Cl. 338-176.000.
Okuyama, Masayoshi; Kido, Yukio; Mimura, Isao; and Nakajima, Etsuro, to Casio Computer Co., Ltd. Electronic timepiece including slidable digital display sections. 4,697,931, Cl. 368-223.000.
Olekna, David J.: *See*—
Hall, Shelby J.; Olekna, David J.; and Davies, Donald M., Jr., 4,698,311, Cl. 436-10.000.
Olin Corporation: *See*—
Crane, Jacob; Muench, George J.; Saleh, Yousef; and Lin, Lifun, 4,698,140, Cl. 204-146.000.
Olympus Optical Co., Ltd.: *See*—
Takamura, Koji; Hosoya, Takamasa; and Kobayashi, Kazunari, 4,697,894, Cl. 350-574.000.
Omata, Nobuaki, to Nifco Inc. One-way damper. 4,697,673, Cl. 188-291.600.
Omura, Takashi: *See*—
Kayane, Yutaka; Sawamoto, Hirokazu; Omura, Takashi; and Harada, Naoki, 4,698,421, Cl. 534-642.000.
Onaka, Toshio: *See*—
Nakanishi, Koichi; Onaka, Toshio; and Inoue, Takashi, 4,698,224, Cl. 426-11.000.
Ono, Akira, to Kabushiki Kaisha Toshiba. Method and apparatus for measuring a forming error of an object. 4,697,927, Cl. 356-360.000.
Ono, Akira: *See*—
Inoue, Senya; Ono, Akira; Kobayashi, Mikio; and Yokoo, Hiroshi, 4,698,317, Cl. 501-9.000.
Ono, Katsuhiro; Sakuma, Tatsuya; and Takahashi, Hiroshi, to Kabushiki Kaisha Toshiba. X-ray tube apparatus. 4,698,835, Cl. 378-136.000.
Ono, Kenji: *See*—
Watanabe, Hiroyuki; Hamada, Eiichi; Hayashi, Motomu; and Ono, Kenji, 4,697,386, Cl. 49-374.000.
Ono, Michio: *See*—
Kubota, Akihiro; Aoki, Tsuyoshi; Ono, Michio; and Sugiura, Rikio, 4,698,660, Cl. 357-70.000.
Ono, Satoshi: *See*—
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, 4,698,838, Cl. 379-58.000.
Ono, Yuichi: *See*—
Umemoto, Yasunari; Takahashi, Susumu; and Ono, Yuichi, 4,698,652, Cl. 357-16.000.
Ono, Yusuke; Ohotoshi, Sachio; and Yamauchi, Masaru, to Asahi Glass Company, Ltd. Method for moistureproof coating of an electrical product. 4,698,240, Cl. 427-58.000.
Onodera, Toshihiro; and Masuda, Youichi, to Kabushiki Kaisha Toshiba. Resonance inverter with control means for detecting peak voltage and having a starting circuit. 4,698,743, Cl. 363-136.000.
Oohasi, Isao: *See*—
Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, 4,698,102, Cl. 148-2.000.
Oohori, Harumi, to Toyota Jidosha Kabushiki Kaisha. Built-in wheel speed sensor structure for a car. 4,698,536, Cl. 310-168.000.
Ookubo, Hiroaki, to Matsushita Electric Industrial Co., Ltd. Electric platen driving device with manual override. 4,697,943, Cl. 400-568.000.
Oonishi, Hajimu: *See*—
Kuramoto, Yukimasa; Oonishi, Hajimu; Sakai, Yukio; Hayashi, Yoshiki; and Wells, Robert C., 4,697,913, Cl. 355-3.00R.
Ootsuka, Shigeharu; and Mizuno, Yuji, to Mitsubishi Denki Kabushiki Kaisha. Structure for attaching a switchgear to a rail. 4,698,726, Cl. 361-335.000.
Oppelt, Herbert: *See*—
Graul, Otto; and Oppelt, Herbert, 4,697,752, Cl. 242-7.110.
Oppenheimer, Robert H.: *See*—
George, Harvey F.; and Oppenheimer, Robert H., 4,697,514, Cl. 101-170.000.
Optima Spanntechnik GmbH: *See*—
Stahl, Bernard; and Bohm, Horst, 4,697,800, Cl. 269-32.000.
Oregon Graduate Center: *See*—
Puretz, Joseph; Orloff, Jonathan H.; DeFreez, Richard K.; and Elliott, Richard A., 4,698,129, Cl. 156-643.000.
Orlandini, Paolo: *See*—
Lucci, Roberto; and Orlandini, Paolo, 4,697,846, Cl. 297-298.000.
Orloff, Jonathan H.: *See*—
Puretz, Joseph; Orloff, Jonathan H.; DeFreez, Richard K.; and Elliott, Richard A., 4,698,129, Cl. 156-643.000.
Orndorff, Gary J.: *See*—
Brewer, Richard A.; Merk, Robert H.; and Orndorff, Gary J., 4,697,505, Cl. 99-450.100.
Ornstein, Jacob J., to GTE Products Corporation. Corrosion resistant thermostatic coil. 4,698,270, Cl. 428-617.000.
Ortho Diagnostic Systems Inc.: *See*—
Hall, Shelby J.; Olekna, David J.; and Davies, Donald M., Jr., 4,698,311, Cl. 436-10.000.
Osada, Akira: *See*—
Suzuki, Fujiyuki; and Osada, Akira, 4,697,559, Cl. 123-325.000.
Osawa, Izumi; Doi, Isao; and Natsuhara, Toshiya, to Minolta Camera Kabushiki Kaisha. Photosensitive member having an amorphous silicon layer. 4,698,287, Cl. 430-57.000.
Osawa, Tomoaki, to Tachi-S Co., Ltd. Interior cover assembly for a vehicle. 4,698,253, Cl. 428-159.000.
Oshibe, Yoshihiro: *See*—
Ohmura, Hiroshi; Oshibe, Yoshihiro; Nakayama, Masaharu; and Yamamoto, Takashi, 4,698,388, Cl. 525-88.000.
Oshizawa, Hidekazu: *See*—
Moriya, Koichi; and Oshizawa, Hidekazu, 4,698,762, Cl. 364-424.100.
Oskarsson, Rolf G.; and Von Holst, Johan P., to Santrade Limited. Body with internal channels and methods of producing the same. 4,698,205, Cl. 419-5.000.
Ostbo, Nils. Gas turbulator. 4,698,016, Cl. 431-171.000.
Oster, Ake R.: *See*—
Wikholm, Bert S.; Carlsson, Torsten L. T.; and Oster, Ake R., 4,698,310, Cl. 435-316.000.
Ostling, Sture: *See*—
Karlsson, Ove; Ostling, Sture; and Adolfsson, Rune, 4,697,937, Cl. 384-486.000.
Otobe, Yutaka; Niikura, Masakatsu; and Wazaki, Yoshio, to Honda Giken Kogyo Kabushiki Kaisha. Supercharging pressure control system for an internal combustion engine with a tubocharger and method of operation. 4,697,421, Cl. 60-602.000.
Ototani, Tohei; and Kataura, Yasuji, to Ototani, Tohei. Composite calcium clads for treating molten iron. 4,698,095, Cl. 75-58.000.
Otsuka, Koji, to Scovill Japan Kabushiki Kaisha. Tack button. 4,697,313, Cl. 24-95.000.
Otsuka, Setsuo: *See*—
Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, 4,698,102, Cl. 148-2.000.
Ottersbach, Thomas V.: *See*—
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Outboard Marine Corporation: *See*—
Ferguson, Arthur R., 4,698,035, Cl. 440-61.000.
Mondek, Matthew H.; and Neal, Louis R., 4,697,556, Cl. 123-195.0HC.
Outokumpu Oy: *See*—
Fugleberg, Sigmund P.; and Poijarvi, Jaakko I., 4,698,139, Cl. 204-112.000.
Overgard, Bruce L., to Celotex Corporation, The. Friction controlled window balance. 4,697,304, Cl. 16-198.000.
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi C.; Fournier, Jeffrey; and Kulman, James, to Energy Conversion Devices, Inc. Vapor deposition of semiconductor material. 4,698,234, Cl. 427-39.000.
Owens-Illinois, Inc.: *See*—
Mumford, George V., 4,697,716, Cl. 215-352.000.
Ozawa, Kunitaka; Haruta, Masahiro; Eida, Tsuyoshi; and Hamamoto, Takashi, to Canon Kabushiki Kaisha. Dyestuff refining system. 4,698,151, Cl. 210-96.100.
PA Incorporated: *See*—
Moake, Gordon L.; and Milewits, Marvin, 4,698,590, Cl. 324-160.000.
Pacala, Thomas J., to United States of America, National Aeronautics and Space Administration. Magnetically switched power supply system for lasers. 4,698,518, Cl. 307-106.000.

Paccar Inc: *See—*
Larsen, Hals N.; and Stephens, Donald L., 4,697,551, Cl. 123-41.310.

Pace Incorporated: *See—*
Barkley, Vincent P.; and Siegel, William J., 4,698,485, Cl. 219-228.000.
Wallgren, Linus E., 4,697,729, Cl. 228-20.000.

Pacholok, David. High efficiency high voltage power supply for gas discharge devices. 4,698,741, Cl. 363-131.000.

Pacific Micro Minerals, Inc.: *See—*
Marihart, John R., 4,698,090, Cl. 71-24.000.

Pack-All, Inc.: *See—*
Kessler, Sheldon; and Strubulis, Vasilios, 4,697,401, Cl. 53-459.000.

Pack, Jerry W.: *See—*
Bouldin, Floyd E.; Bouldin, Lloyd; Bouldin, Dwight; and Pack, Jerry W., 4,697,623, Cl. 141-80.000.

Paeye, Gerard, to Jeumont-Schneider Corporation. Thermal energy collector. 4,697,433, Cl. 62-235.100.

Pagliaro, Robert H., Jr.: *See—*
Corboy, John F., Jr.; Pagliaro, Robert H., Jr.; Jastrzebski, Lubomir L.; and Soydan, Ramazan, 4,698,316, Cl. 437-89.000.

Paice, Derek A., to Westinghouse Electric Corp. 12-Pulse motor drive. 4,698,739, Cl. 363-71.000.

Pajerski, Michael J.; Gray, Steven J.; Flakas, Gerald K.; and Cotic, Dennis J., to General Electric Company. Drive design for mobile x-ray units with dual wheel drives. 4,697,661, Cl. 180-6.500.

Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., to Colorocs Corporation. Improved print quality monitoring for color electrophotography. 4,697,920, Cl. 355-14.0CH.

Palmans, Jos, to Alliance Enamelsteel Corporation S.A. Blackboard rubber made of, or including, metal. 4,697,301, Cl. 15-426.000.

Paltchin, Vassil A.: *See—*
Gaydarov, Emanuil S.; Russev, Koytcho Y.; Paltchin, Vassil A.; and Stoilov, Ivan T., 4,698,462, Cl. 191-59.100.

Palumbo, Angeline. Convertible garment. 4,697,288, Cl. 2-269.00R.

Pappenheimer, John R.: *See—*
Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, 4,698,330, Cl. 514-19.000.

Papst-Motoren GmbH & Co. K.G.: *See—*
Muller, Rolf, 4,698,542, Cl. 310-67.00R.

Parent, Christopher A.; and Voss, James R., to United Innovations Division of United Engineers, Inc. Positioning systems. 4,697,348, Cl. 33-18.100.

Parisch, Jochen: *See—*
Klein, Norbert; Parisch, Jochen; and Zweigart, Gerhard, 4,697,841, Cl. 296-84.00R.

Parker Hannifin Corporation: *See—*
Swift, William; and Fischell, Robert E., 4,697,622, Cl. 141-1.000.

Parker, Robert R.: *See—*
Rattan, Dev R.; and Parker, Robert R., 4,698,770, Cl. 364-900.000.

Parkins, Donald L. Locksmith's wedge for automobile doors. 4,697,789, Cl. 254-104.000.

Parks-Cramer Company: *See—*
Mulligan, William L., 4,697,298, Cl. 15-312.00R.

Parmatic Filter Corporation: *See—*
Mavros, Stratos, 4,698,078, Cl. 55-213.000.

Parmigiani, Bruno; and Lanfranconi, Gianmario, to Societa' Cavi Pirelli S.p.A. Joint for cables with an extruded insulation. 4,698,458, Cl. 174-73.00R.

Parsons, Edward L., Jr.: *See—*
Darragh, Charles T.; and Parsons, Edward L., Jr., 4,697,633, Cl. 165-51.000.

Parvin, Bahram A., to Ford Aerospace & Communications Corporation. Systolic array for solving cyclic loop dependent algorithms. 4,698,751, Cl. 364-200.000.

Paske, William C., to NL Industries, Inc. System for simultaneous gamma-gamma formation density logging while drilling. 4,698,501, Cl. 250-265.000.

Pass, Shimeon: *See—*
Patchornik, Abraham; Shai, Yechiel; and Pass, Shimeon, 4,698,208, Cl. 422-62.000.

Patchornik, Abraham; Shai, Yechiel; and Pass, Shimeon, to Yeda Research and Development Co., Ltd. Apparatus for multipolymer synthesis of organic compounds. 4,698,208, Cl. 422-62.000.

Patel, Ramanlal L., to Henley Group, Inc., The. Rocker arm with cam-contacting roller. 4,697,473, Cl. 74-519.000.

Paterson, James L.; and Haken, Boger A., to Texas Instruments Incorporated. Floating gate memory process with improved dielectric. 4,697,330, Cl. 437-42.000.

Patton, Roy D., to Colt Industries Inc. Electrode for electrical discharge machining. 4,698,543, Cl. 313-357.000.

Paulus, Wilfried: *See—*
Beck, Gunther; Reinecke, Paul; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,698,357, Cl. 514-370.000.

Pavlin, Mark S., to Union Camp Corporation. Terpene ether aroma chemicals. 4,698,180, Cl. 252-522.00R.

Payson, J. Scott: *See—*
den Boer, Willem; Payson, J. Scott; and Yaniv, Zvi, 4,698,627, Cl. 340-718.000.

Pearce, George W. Wind controlled spraying. 4,697,737, Cl. 239-67.000.

Pearson, Allan: *See—*
Pelto, Elmer M.; and Pearson, Allan, 4,697,960, Cl. 405-260.000.

Peck, Douglas J.: *See—*
Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., 4,697,730, Cl. 228-37.000.

Pedersen, David; and Cupidro, Vincent N., to Hy-Meg Corporation. Method of manufacturing a film-type electronic device. 4,697,335, Cl. 29-620.000.

Peebles, John A.; and Swinton, James D., to NCR Corporation. Sheet feeding apparatus with cooperating endless belts. 4,697,944, Cl. 400-635.000.

Peek, Ralf, to California Institute of Technology. Preuplift technique of anchoring a cylindrical liquid storage tank for lateral loading. 4,697,395, Cl. 52-167.000.

Peerless Lighting Corporation: *See—*
Ngai, Peter Y. Y., 4,698,734, Cl. 362-225.000.

Pekelis, Boris L.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

Pelc, Norbert J.: *See—*
Glover, Gary H.; and Pelc, Norbert J., 4,698,591, Cl. 324-307.000.

Pelkey, Terry L. Motor driven bulk material roll and wrapping machine. 4,697,602, Cl. 131-51.000.

Pelleboer, Nicolaas, to Nederlandse Industriele Maatschappij Nefit B.V. Ball valve made entirely of plastics material. 4,697,787, Cl. 251-315.000.

Pellkofer, Dieter: *See—*
Gugel, Siegfried; Pellkofer, Dieter; and Forner, Siegfried, 4,698,474, Cl. 219-60.00A.

Pelster, Bernhard: *See—*
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.

Pelto, Elmer M.; and Pearson, Allan, to Cominco Ltd. Method and apparatus for anchoring rock bolts and cables. 4,697,960, Cl. 405-260.000.

Peltola, Heikki, to Flakt Aktiebolag. Separating apparatus. 4,698,077, Cl. 55-204.000.

Penner, Horst; and Jensen, Ernst, to Dynamit Nobel Aktiengesellschaft. After-firing safety. 4,697,524, Cl. 102-498.000.

Peppel, Joerg-Michael, to Siemens Aktiengesellschaft. Method and apparatus to trigger the current-conducting state of gate-turn-off thyristor. 4,698,520, Cl. 307-633.000.

Perez, Antonio C., to Vileda GmbH, Firma. Plug, socket and plug-and-socket coupling thereof for temporarily attaching an implement to a handle. 4,697,949, Cl. 403-361.000.

Perfetti, Giorgio; and Sozzi, Giuseppe, to Gum Base Co., S.p.A. Nocalorie, non-cariogenic chewing gum composition. 4,698,223, Cl. 426-4.000.

Perkin-Elmer Corporation, The: *See—*
Herman, John; and Chirico, George, 4,698,585, Cl. 324-66.000.

Perlick Company, Inc., The: *See—*
Lecher, Theodore R., 4,697,855, Cl. 312-290.000.

Perlov, Gena; and Tuchman, Samuel. Electrodynamic peristaltic fluid transfer device and method. 4,697,989, Cl. 417-53.000.

Perzborn, Elisabeth: *See—*
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.

Peters, Kenneth R.: *See—*
Carpenter, James H., Jr.; and Peters, Kenneth R., 4,697,391, Cl. 51-434.000.

Peterson, LuVerne R., to Unisys Corporation. Memory system employing a zero DC power gate array for error correction. 4,698,812, Cl. 371-38.000.

Peterson, Lynn, to Eastman Christensen Company. Diamond setting in a cutting tooth in a drill bit with an increased effective diamond width. 4,697,653, Cl. 175-329.000.

Peth, Horst: *See—*
Hess, Heinz; and Peth, Horst, 4,698,667, Cl. 358-35.000.

Petro-Tube, Inc.: *See—*
Wood, Kenneth M.; and Jarveaux, Frank, 4,697,830, Cl. 285-27.000.

Petrofsky, Jerrold S.: *See—*
Larson, Paul F.; Douglas, Roy D.; Petrofsky, Jerrold S.; and Phillips, Chandler A., 4,697,808, Cl. 272-70.000.

Peukert, Eberhard: *See—*
Jeromin, Lutz; Peukert, Eberhard; and Wollmann, Gerhard, 4,698,186, Cl. 260-421.000.

Pfeifer, Josef; and Duthaler, Rudolf, to Ciba-Geigy Corporation. Polyimides, a process for their preparation and their use, and tetracarboxylic acids and tetracarboxylic acid derivatives. 4,698,295, Cl. 430-325.000.

Pfizer Inc.: *See—*
Massett, Stephen S., 4,698,444, Cl. 564-54.000.

PGEP Professional General Electric Corp.: *See—*
Roos, Andre; Dutertre-Laduree, Daniel; Goldman, Max; and Goldman, Alice, 4,698,586, Cl. 324-71.100.

Pham, Van Doan, to Alsthom. Sulphur hexafluoride circuit breaker usable at very low outside temperatures. 4,698,468, Cl. 200-148.00B.

Pham, Van Doan; and Thuries, Edmond, to Alsthom. Sulfur hexafluoride circuit breaker operating in a very low temperature environment. 4,698,469, Cl. 200-148.00E.

Phantom Firework Manufacturing Company Limited: *See—*
Lau, Nam S.; and Lau, Yick J., 4,697,518, Cl. 102-358.000.

Pharmaceutical Innovators Ltd.: *See—*
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., 4,697,721, Cl. 221-211.000.

Phillips, Allyn E.: *See—*
Johnson, Harold R., III; Phillips, Allyn E.; Carrigan, Erwin R.; Virgo, Richard A.; and Mickelson, James E., 4,697,675, Cl. 192-7.000.

Phillips, Chandler A.: *See—*
Larson, Paul F.; Douglas, Roy D.; Petrofsky, Jerrold S.; and Phillips, Chandler A., 4,697,808, Cl. 272-70.000.

Phillips Petroleum Company: *See—*
Gray, Michael L.; and Gibson, Kristie C., 4,698,080, Cl. 62-21.000.
Hill, H. Wayne, Jr.; and Cliffton, Michael D., 4,698,411, Cl. 528-303.000.
Stewart, William S., 4,698,313, Cl. 436-55.000.
Young, Richard K., 4,697,637, Cl. 165-160.000.

Piber, Earl T., to Eaton Corporation. Trigger operated portable electric tool switch. 4,698,471, Cl. 200-302.200.

Piccolo, Oreste: *See—*
Verga, Alberto; Piccolo, Oreste; and Valoti, Ermanno, 4,698,432, Cl. 548-224.000.

Pick, James M., to Eaton Corporation. Coil frame assembly and the method of making same. 4,698,610, Cl. 335-281.000.

Pick, James M.: *See—*
Kolze, Lawrence A.; Pick, James M.; and Swanson, Wesley S., 4,697,608, Cl. 137-1.000.

Pierce, Neil J.: *See—*
Jeffery, Jon R.; and Pierce, Neil J., 4,697,419, Cl. 60-464.000.

Piffard, Jean-Francois: *See—*
Belot, Dominique; Rade, Jean-Yves; Piffard, Jean-Francois; Larquet, Christian; and Cornut, Philippe, 4,698,218, Cl. 423-347.000.

Pilling Co.: *See—*
Richards, John R., 4,697,870, Cl. 350-96.200.

Pineau, Didier, to Societe Nationale Industrielle et Aerospatiale. Multilayer refractory structure and a wall provided with such a refractory structure. 4,698,255, Cl. 428-215.000.

Pioneer Electronic Corporation: *See—*
Kosaka, Minoru; and Banno, Tutomu, 4,698,695, Cl. 358-338.000.
Yoshio, Junichi, 4,698,795, Cl. 369-44.000.

Pioneer Video Corporation: *See—*
Okano, Takashi, 4,698,697, Cl. 358-340.000.

Pitcher, Bruce. Resilient glove tree. 4,697,724, Cl. 223-78.000.

Pitney Bowes Inc.: *See—*
Di Giulio, Peter C., 4,698,829, Cl. 377-16.000.
Fassman, Arnold; and Salancy, William, 4,697,517, Cl. 101-348.000.

Pitter, Andreas; and Stenkamp, Werner, to Isetron Industrie-und Sicherheits-Elektronik GmbH. Apparatus for lifting equipment. 4,697,798, Cl. 267-70.000.

Plagens, Mark R., to Honeywell Inc. MESFET logic using integral diode level shifting. 4,698,524, Cl. 307-450.000.

Plaisance, Teddy J. Pivotal bumper attachment. 4,697,956, Cl. 405-213.000.

Plannja AB: *See—*
Kero, Ernst; and Gustafsson, Erik, 4,697,529, Cl. 108-511.000.

Plaston AG: *See—*
Gutmann, Franz, 4,698,188, Cl. 261-107.000.

Plavskikh, Vladimir D.: *See—*
Kostylev, Alexandr D.; Plavskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., 4,697,647, Cl. 173-91.000.

Plessey Overseas Limited: *See—*
Rhodes, Stephen J., 4,698,125, Cl. 156-643.000.

Pneumo Corporation: *See—*
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,697,499, Cl. 92-151.000.

Pocci, Marco: *See—*
Bertini, Vincenzo; Marabini, Anna; De Munno, Angela; Barbaro, Maria; and Pocci, Marco, 4,698,171, Cl. 252-60.000.

Pohl, Hans C. Method of cooling partial oxidation gas containing finely divided impurities and used for combustion in a combined gas-steam turbine of a power plant. 4,697,413, Cl. 60-39.020.

Poijarvi, Jaakko I.: *See—*
Fugleberg, Sigmund P.; and Poijarvi, Jaakko I., 4,698,139, Cl. 204-112.000.

Polaris Industries, Inc.: *See—*
Eastman, Robert A.; Rugland, Larry D.; and Monsrud, Edwin M., 4,697,665, Cl. 180-230.000.

Polifroni, Nicholas: *See—*
Thulin, Robert; Ross, Robert E.; and Polifroni, Nicholas, 4,698,000, Cl. 425-133.100.

Pollard, Jean: *See—*
Blanc, Michel; Pollard, Jean; Marchand, Gerard; and Henri, Rene , 4,697,867, Cl. 350-96.100.

Pollich, Gerhard, to Heidelberger Druckmaschinen AG. Sheet feeder for rotary printing machines. 4,697,804, Cl. 271-162.000.

Polonsky, Vladimir M.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

Pond, Richard J., to R J Pond Limited. Pipe connection joints. 4,697,829, Cl. 285-18.000.

Pontagnier, Henri: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Pontagnier, Henri; and Prat, Gisele, 4,698,343, Cl. 514-255.000.

Pony Industries, Inc.: *See—*
Hansen, Gerald D., 4,698,161, Cl. 210-701.000.

Portman, Joe L., Jr.; and Margraf, David J. Piezoelectric weighing device. 4,697,657, Cl. 177-210.0FP.

Potts, John T., Jr.: *See—*
Neer, Robert M.; Potts, John T., Jr.; and Slovik, David M., 4,698,328, Cl. 514-12.000.

Poulin, Bernard, to Glaenzer Spicer. Transmission device in particular for a driving wheel of a motor vehicle. 4,698,046, Cl. 464-115.000.

Powell, Theo J.: *See—*
Hwang, Yin-Chao; and Powell, Theo J., 4,698,588, Cl. 324-73.00R.

Power Conversion Inc.: *See—*
Mantello, Ralph, 4,698,282, Cl. 429-56.000.

Powers, Debora L.; Powers, John G.; and Rogina, Eugene L. Water conservation system. 4,697,614, Cl. 137-337.000.

Powers, John G.: *See—*
Powers, Debora L.; Powers, John G.; and Rogina, Eugene L., 4,697,614, Cl. 137-337.000.

PPG Industries, Inc.: *See—*
Jensen, Thomas H., 4,698,082, Cl. 65-1.000.

Prakken, Bouwe. Apparatus for testing the leaktightness of filled, closed packages of flexible material. 4,697,452, Cl. 73-49.300.

Prang, Jorgen S., to Alliance Pentagon A/S. Three-layer laminated panel and method for production. 4,698,278, Cl. 428-314.400.

Prat, Gisele: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Pontagnier, Henri; and Prat, Gisele, 4,698,343, Cl. 514-255.000.

Pratt, W. Robert: *See—*
Jones, Gerald W.; Pratt, W. Robert; and Summa, William J., 4,697,923, Cl. 356-239.000.

Precision Handling Devices, Inc.: *See—*
Hubbard, Dohn D., II, 4,697,727, Cl. 226-74.000.

Precision Mecanique Labinal: *See—*
Vandame, Bertrand, 4,698,027, Cl. 439-271.000.

Precision Shooting Equipment Company: *See—*
Shepley, Pete; Johnston, Richard; and Smith, Allan F., 4,697,350, Cl. 33-265.000.

Preco Industries, Inc.: *See—*
Raney, Charles C., 4,697,485, Cl. 83-34.000.

Premier Industrial Corporation: *See—*
Schnipke, Dennis E., 4,697,742, Cl. 239-587.000.

President & Fellows of Harvard College: *See—*
Krueger, James M.; Pappenheimer, John R.; Karnovsky, Manfred L.; Lefrancier, Pierre; Choay, Jean; Chedid, Louis; and Lederer, Edgar, 4,698,330, Cl. 514-19.000.

Prestige Skirting and Tablecloths Inc.: *See—*
Enison, Brent M., 4,698,117, Cl. 156-486.000.

Prew, Stanley R., to SWM Corporation. Live center bin modification. 4,697,750, Cl. 241-247.000.

Priaroggia, Paolo G., to Societa Cavi Pirelli S.p.A. Pressure resistant submarine optical fiber cable. 4,697,875, Cl. 350-96.230.

Priest, Mark A.: *See—*
Handke, Wayne A.; and Priest, Mark A., 4,698,510, Cl. 250-506.100.

Printzen, Helmut: *See—*
Burow, Wilfried; Printzen, Helmut; Brunn, Horst; and Nollen, Klaus, 4,698,100, Cl. 106-304.000.

Procter & Gamble Company, The: *See—*
Brewer, Richard A.; Merk, Robert H.; and Orndorff, Gary J., 4,697,505, Cl. 99-450.100.
Burckett St. Laurent, James C. T.; and Busch, Alfred, 4,698,167, Cl. 252-8.800.
Lewis, William K., 4,698,181, Cl. 252-527.000.

Proetta, William J.: *See—*
Liuzzo, James G.; and Proetta, William J., 4,698,618, Cl. 340-365.00R.

Pronobis, Mark T.: *See—*
Burns, Daniel J.; Eldering, Charles A.; and Pronobis, Mark T., 4,698,587, Cl. 324-73.00R.

Proto-Tel, Inc.: *See—*
Hotchkiss, Kenneth W.; and Woodward, Arthur B., 4,697,720, Cl. 220-337.000.

Pruftechnik Dieter Busch & Partner GmbH & Co.: *See—*
Lysen, Heinrich, 4,698,491, Cl. 250-201.000.

Pryor, Nicholas. Closet storage arrangement. 4,697,713, Cl. 211-189.000.

Pullman Rail Leasing Inc.: *See—*
Rehbein, Richard E., 4,697,528, Cl. 105-358.000.

Purdue Research Foundation: *See—*
Chrisnian, Charles L.; Bidwell, Christopher A.; and Libey, George S, 4,697,546, Cl. 119-3.000.
Citron, Stephen J., 4,697,561, Cl. 123-339.000.

Puretz, Joseph; Orloff, Jonathan H.; DeFreez, Richard K.; and Elliott, Richard A., to Oregon Graduate Center. Focused ion beam micromachining of optical surfaces in materials. 4,698,129, Cl. 156-643.000.

Puroflow Corp.: *See—*
Warren, George H., 4,698,721, Cl. 361-110.000.

Qantix Corporation: *See—*
Brown, John W., 4,697,881, Cl. 350-276.00R.

Quaker Oats Company, The: *See—*
Kamman, Gordon W., 4,697,845, Cl. 297-118.000.

Quast, Jorn-Rainer: *See—*
Reuter, Horst; Quast, Jorn-Rainer; Maier, Peter; and Brenner, Heinrich, 4,697,793, Cl. 267-195.000.

Quigley, Vincent P.: *See—*
Shyu, Wen B.; Woodhead, David A.; and Quigley, Vincent P., 4,698,389, Cl. 525-96.000.

Quixotic, Inc.: *See*—
Tunstall, John R., 4,697,378, Cl. 43-42.090.
Quodala, Genaro M.: *See*—
Walters, Paul W.; Raiche, H. Anthony; Harness, Ronald L.; and Quodala, Genaro M., 4,698,212, Cl. 422-144.000.
R.F.D. Consultants Pty. Ltd.: *See*—
Knight, John K., 4,697,396, Cl. 52-170.000.
R J Pond Limited: *See*—
Pond, Richard J., 4,697,829, Cl. 285-18.000.
Raab, Simon, to Sirdan Research Limited. Desalinating drip-irrigation system. 4,698,135, Cl. 202-234.000.
Raasch, Hans, to W. Schlafhorst & Co. Device for exchanging empty cans with cans filled with sliver. 4,697,310, Cl. 19-159.00A.
Rade, Jean-Yves: *See*—
Belot, Dominique; Rade, Jean-Yves; Piffard, Jean-Francois; Larquet, Christian; and Cornut, Philippe, 4,698,218, Cl. 423-347.000.
Raghunathan, Kuppuswamy: *See*—
Wilkie, Brian F.; Gallup, Michael; Suchyta, John; and Raghunathan, Kuppuswamy, 4,698,750, Cl. 364-200.000.
Raiche, H. Anthony: *See*—
Walters, Paul W.; Raiche, H. Anthony; Harness, Ronald L.; and Quodala, Genaro M., 4,698,212, Cl. 422-144.000.
Rajala, Gregory J.; and Shavlik, Robert J., to Kimberly-Clark Corporation. Conveying systems. 4,697,693, Cl. 198-699.000.
Ralph McKay Limited: *See*—
Johnson, William M.; and Mere, Ilmar, 4,697,646, Cl. 172-730.000.
Ralphs, George T., to C. & J. Clark Limited. Apparatus for the reaction moulding of plastics materials. 4,698,006, Cl. 425-185.000.
Ralston, James E. Tremolo control arm retainer. 4,697,493, Cl. 84-313.000.
Ramnarine, Wayne D., to Nabisco Brands, Inc. Nozzle for extrusion. 4,698,004, Cl. 425-131.100.
Ramtek Corporation: *See*—
Goldstein, Arthur, 4,698,746, Cl. 364-200.000.
Rando, Joseph F.; and Jones, Henry W., to Spectra-Physics, Inc. Beam delivery system for a CO_2 laser. 4,698,479, Cl. 219-121.0LV.
Raney, Charles C., to Preco Industries, Inc. Die press having 3-axis registration system operable during material advancement. 4,697,485, Cl. 83-34.000.
Raszewski, Lewis R., to Crowell Corporation, The. Packaging laminate. 4,698,254, Cl. 428-215.000.
Rattan, Dev R.; and Parker, Robert R., to Bell & Howell Company. Computer controlled video device and slide projector interface arrangement. 4,698,770, Cl. 364-900.000.
Raubenheimer, Hans-Juergen: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Hettche, Albert; Schneider, Rolf; and Raubenheimer, Hans-Juergen, 4,698,174, Cl. 252-174.240.
Rauch, Joyce: *See*—
Janoff, Andrew S.; Rauch, Joyce; and Tilcock, Colin P. S., 4,698,299, Cl. 435-13.000.
Ravizza SpA: *See*—
Verga, Alberto; Piccolo, Oreste; and Valoti, Ermanno, 4,698,432, Cl. 548-224.000.
Ray, Siba P., to Aluminum Company of America. Densified composite containing one or more interwoven matrix compositions. 4,698,319, Cl. 501-87.000.
Raychem Corporation: *See*—
Jansons, Viktors; Gors, Heinrich C.; Moore, Stephen; Reamey, Robert H.; and Becker, Paul, 4,698,393, Cl. 525-242.000.
Sandberg, Chester L., 4,698,583, Cl. 324-546.000.
Raymond, Kenneth N.; Scarrow, Robert C.; and White, David L., to United States of America, Energy. Hydroxypyridonate chelating agents. 4,698,431, Cl. 546-298.000.
RCA Corporation: *See*—
Astle, Brian, 4,698,682, Cl. 358-182.000.
Balaban, Alvin R.; and Steckler, Steven A., 4,698,679, Cl. 358-153.000.
Beaverson, Gregory K., 4,698,685, Cl. 358-213.150.
Burt, Peter J.; and Adelson, Edward H., 4,698,843, Cl. 382-54.000.
Carrell, Ross M., 4,697,689, Cl. 198-394.000.
Casey, Robert F., 4,698,675, Cl. 358-140.000.
Corboy, John F., Jr.; Pagliaro, Robert H., Jr.; Jastrzebski, Lubomir L.; and Soydan, Ramazan, 4,698,316, Cl. 437-89.000.
Dennis, Timothy A., 4,698,132, Cl. 156-657.000.
Lewis, Henry G., Jr.; and Ng, Sheau-Bao, 4,698,680, Cl. 358-166.000.
Reamey, Robert H.: *See*—
Jansons, Viktors; Gors, Heinrich C.; Moore, Stephen; Reamey, Robert H.; and Becker, Paul, 4,698,393, Cl. 525-242.000.
Rebeaud, Jean-Claude: *See*—
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Rebek, Julius, to Year Laboratories, Inc. 1,3 Disubstituted aromatic cyclohexane imides. 4,698,425, Cl. 544-235.000.
Redman, Gary M., to GTE Sprint Communications Corp. Adjustable platform mounteed horn antenna. 4,698,640, Cl. 343-882.000.
Redman, Gary M.: *See*—
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Redmond, Holly F.: *See*—
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Reed Mining Tools, Inc.: *See*—
Walk, Howard J., 4,697,652, Cl. 175-325.000.
Reed, Paul A.: *See*—
Flannagan, Stephen T.; Reed, Paul A.; and Barnes, John, 4,698,788, Cl. 365-205.000.
Regal Ware, Inc.: *See*—
Hupf, Charles J., 4,697,501, Cl. 99-279.000.
Regenerative Environmental Equip. Co., Inc.: *See*—
Benedick, Edward H., 4,697,531, Cl. 110-336.000.
Regie Nationale des Usines Renault: *See*—
Boccadoro, Yves; and Shuttler, Philippe, 4,697,562, Cl. 123-339.000.
Regionala Stiftelsen i Varmland med firma Erres: *See*—
Alklind, Lars E.; and Nilsson, Eric, 4,697,290, Cl. 5-61.000.
Rehbein, Richard E., to Pullman Rail Leasing Inc. Railway tank car with protective device for protrusion. 4,697,528, Cl. 105-358.000.
Reichenbach, Reiner: *See*—
Harsch, Erich; and Reichenbach, Reiner, 4,697,449, Cl. 72-405.000.
Reichenberger, Helmut, to Siemens Aktiengesellschaft. Shock wave tube for the fragmentation of concrements. 4,697,588, Cl. 128-328.000.
Reihl, Bruno: *See*—
Bednorz, Johannes G.; Gimzewski, James K.; and Reihl, Bruno, 4,698,502, Cl. 250-306.000.
Reinecke, Paul: *See*—
Beck, Gunther; Reinecke, Paul; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,698,357, Cl. 514-370.000.
Reis, Herbert: *See*—
Greenfeld, Albert R.; Reis, Herbert; and Tittmann, Bernhard R., 4,698,058, Cl. 604-266.000.
Reishauer AG: *See*—
Wirz, Walter, 4,697,387, Cl. 51-88.000.
Reliance Electric Company: *See*—
Dawson, Robert H., 4,698,031, Cl. 439-863.000.
Research Association for Petroleum Alternatives Development: *See*—
Imai, Tetsuya; Fujita, Hiroshi; Koikeda, Minoru; and Suzuki, Takashi, 4,698,449, Cl. 585-469.000.
Research Laboratories of Australia Pty. Ltd.: *See*—
Spooner, Anthony N.; and Lima-Marques, Luis, 4,697,463, Cl. 73-866.000.
Restall, James E.; and Hayman, Cecil, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the. Cleaning of metal articles. 4,698,130, Cl. 156-646.000.
Reuter, Horst; Quast, Jorn-Rainer; Maier, Peter; and Brenner, Heinrich, to BOGE GmbH. Hydraulically damped elastic engine mount. 4,697,793, Cl. 267-195.000.
Rexnord Inc.: *See*—
Sawant, Ulhas S.; Karra, Vijia K.; and Kaja, Dean M., 4,697,745, Cl. 241-30.000.
Reyner, Franklin W., Jr.: *See*—
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., 4,697,721, Cl. 221-211.000.
Reyner, Mark F.: *See*—
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., 4,697,721, Cl. 221-211.000.
Reznikov, Igor I.: *See*—
Kostylev, Alexandr D.; Plavtskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., 4,697,647, Cl. 173-91.000.
Rheinmetall GmbH: *See*—
Bocker, Jurgen; Luther, Hans W.; Wallow, Peter; and Fritsch, Horst, 4,697,525, Cl. 102-518.000.
Rhodes, Bernard J. Self-closing child-proof hinge/lock mechanism. 4,697,306, Cl. 16-317.000.
Rhodes, Stephen J., to Plessey Overseas Limited. Method of producing a layered structure. 4,698,125, Cl. 156-643.000.
Rhone-Poulenc Agrochimie: *See*—
Horriere, Daniel; and Chazalet, Maurice, 4,698,334, Cl. 514-141.000.
Rhone-Poulenc Recherches: *See*—
Le Coent, Jean-Louis, 4,698,170, Cl. 252-33.200.
Rhone-Poulenc Specialties Chimiques: *See*—
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,698,175, Cl. 252-182.000.
Riccitelli, Ivan, to Conti Paoli & Meritex S.r.l. Method and machine for knitting garments having legs and a body portion. 4,697,440, Cl. 66-177.000.
Rice, Joseph A., Jr.; McGregor, Douglas D.; Colegrove, Forrest D.; and Marton, Bela, to Texas Instruments Incorporated. Smart mine. 4,697,519, Cl. 102-406.000.
Richards, Harvey J.: *See*—
Goel, Anil B.; and Richards, Harvey J., 4,698,408, Cl. 528-48.000.
Goel, Anil B.; and Richards, Harvey J., 4,698,416, Cl. 528-389.000.
Richards, John R., to Pilling Co. Termination for light-conducting cable. 4,697,870, Cl. 350-96.200.
Richter, Karl M.; and Harder, Hans E., to Howmedica International, Inc. Charger for a battery-operated surgical machine. 4,698,579, Cl. 320-14.000.
Ricoh Company, Ltd.: *See*—
Ito, Masahiro; Murayama, Noboru; Suziku, Koichi; Sato, Kei; and Sato, Tsutomu, 4,698,778, Cl. 364-518.000.
Suzuki, Koichi; Murayama, Noboru; Ito, Masahiro; and Sato, Kei, 4,698,691, Cl. 358-283.000.
Riemann, Achim: *See*—
Ude, Werner; Besecke, Siegmund; Riemann, Achim; and Schroeder, Guenther, 4,698,448, Cl. 568-14.000.

Riesner, Gerhard; and Koch, Walther, to Diehl GmbH & Co. Arrangement of components. 4,698,729, Cl. 361-386.000.

Rigot, Guy J.: *See*—
Le Clerco, Pierre A. L. M. G.; Delheusy, Jean C.; and Rigot, Guy J., 4,697,955, Cl. 405-135.000.

Rikagaku Kenkyusho: *See*—
Ohira, Shigeo; and Iwaki, Masaya, 4,698,233, Cl. 427-38.000.

Riker Laboratories, Inc.: *See*—
Gerster, John F., 4,698,348, Cl. 514-293.000.

Rinaldi, Gianfranco: *See*—
Albanesi, Giancarlo; and Rinaldi, Gianfranco, 4,698,215, Cl. 423-274.000.

Ritter, Allen M.: *See*—
Seymour, Robert A.; Ritter, Allen M.; Kellogg, Richard A.; and D'Atre, John D., 4,698,577, Cl. 318-805.000.

RIV-SKF Officine Di Villar Perosa S.p.A.: *See*—
Bermond, Gabriele; and Vignotto, Angelo, 4,697,936, Cl. 384-484.000.

Roark, David N.; Nugent, Adam, Jr.; and Bandlish, Baldev K., to Ethyl Corporation. Fluid loss control in well cement slurries. 4,698,380, Cl. 524-2.000.

Robbins, Kenneth W.: *See*—
Lamensdorf, David; Robbins, Kenneth W.; and Ross, Gerald F., 4,698,633, Cl. 342-42.000.

Roberson, Dalton. Automatic dual action apparatus and method for uniformly coating the inside of tubular extensions. 4,698,241, Cl. 427-183.000.

Robert Bosch GmbH: *See*—
Becker, Rudiger; Clement, Albrecht; Virgilio, Gustav; and Weller, Hugo, 4,697,563, Cl. 123-421.000.
Hess, Heinz; and Peth, Horst, 4,698,667, Cl. 358-35.000.

Roberts, Patrick S.; and Weiss, Leonard, to Spartus Corporation. Transformerless clock circuit with duplex optoelectronic display. 4,697,930, Cl. 368-82.000.

Roberts, Peter: *See*—
Entwistle, Brian; Roberts, Peter; and Rogerson, John M., 4,698,766, Cl. 364-468.000.

Roberts, Robert D.: *See*—
Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., 4,697,624, Cl. 141-208.000.

Robeson, Lloyd M.; Harris, James E.; Kawakami, James H.; and Maresca, Louis M., to Amoco Corporation. Miscible blends of polycarbonate with vinyl chloride derived polymers. 4,698,390, Cl. 525-133.000.

Robideau, Terry. Radiator cap safety twist-off tool. 4,697,480, Cl. 81-3.090.

Robinson, David M.: *See*—
Wells, William D.; Robinson, David M.; DeLuca, Richard M.; and Burwen, Eric D., 4,698,509, Cl. 250-492.200.

Robinson, Melvin E. R.: *See*—
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,697,718, Cl. 220-82.00R.

Robortaccio, Rocco J.: *See*—
Cavaliere, Joseph R.; Chang, Albert Y.; and Robortaccio, Rocco J., 4,698,800, Cl. 370-24.000.

Robot Defense Systems, Inc.: *See*—
Mahoney, Thomas J.; and Lang, Michael, 4,698,498, Cl. 250-23[illegible].000.

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Kuusi, Juhani, 4,698,832, Cl. 378-46.000.

Roby, Gerard: *See*—
Sarton, Francois; and Roby, Gerard, 4,697,774, Cl. 248-221.400.

Rock, Erich; and Hollenstein, Helmut, to Julius Blum Gesellschaft m.b.H. Furniture connector. 4,697,946, Cl. 403-9.000.

Rockwell, Gary L., to Diversified Products Corp. Cable-operated exerciser. 4,697,809, Cl. 272-118.000.

Rockwell International Corporation: *See*—
Bhowmik, Anup; and McMullin, Wayne A., 4,698,815, Cl. 372-2.000.
Custode, Frank Z., 4,697,328, Cl. 437-41.000.
Morgan, Peter E. D., 4,698,417, Cl. 528-395.000.

Rodgers, Eugene L.; and Stacey, Eric J., to Westinghouse Electric Corp. Current fed regulated voltage supply. 4,698,740, Cl. 363-89.000.

Rodgers, Herman R. Tool for attaching and detaching spring clip from shaft. 4,697,483, Cl. 81-418.000.

Roemer, Frederick D.: *See*—
Tateosian, Louis; and Roemer, Frederick D., 4,698,373, Cl. 522-95.000.

Rogerson, John M.: *See*—
Entwistle, Brian; Roberts, Peter; and Rogerson, John M., 4,698,766, Cl. 364-468.000.

Rogina, Eugene L.: *See*—
Powers, Debora L.; Powers, John G.; and Rogina, Eugene L., 4,697,614, Cl. 137-337.000.

Rohde, Wilhelm; Koch, Hannsjorg; and Metschl, Michael, to Linde Aktiengesellschaft. Adsorber bed apparatus. 4,698,072, Cl. 55-31.000.

Rohde, Wilhelm; and Klein, Gunter, deceased, to Linde Aktiengesellschaft. Process for regeneration of adsorbers. 4,698,073, Cl. 55-33.000.

Rohm GmbH: *See*—
Ude, Werner; Besecke, Siegmund; Riemann, Achim; and Schroeder, Guenther, 4,698,448, Cl. 568-14.000.

Rohm and Haas Company: *See*—
Schindler, Frederick J., 4,698,385, Cl. 524-733.000.

Rohwedder, Arnim: *See*—
Wessels, Gerd; and Rohwedder, Arnim, 4,697,579, Cl. 128-24.00A.

Rolf, Helmut, to Leonhardy GmbH. Terminal connection pin for solderless connections. 4,698,026, Cl. 439-82.000.

Rolls-Royce plc: *See*—
Macintyre, Robert M., 4,698,237, Cl. 427-53.100.

Rombout, Anton, to Windmoller & Holscher. Mounting means for plate cylinders of a printing machine having replaceable sleevelike plate cylinder shells. 4,697,516, Cl. 101-216.000.

Romine, Richard A. Dust-confining vacuum sander. 4,697,389, Cl. 51-180.000.

Roos, Andre; Dutertre-Laduree, Daniel; Goldman, Max; and Goldman, Alice, to PGEP Professional General Electric Corp. Electric particle detector for the detection of fire. 4,698,586, Cl. 324-71.100.

Roschmann, Peter, to U.S. Philips Corporation. NMR-apparatus with an adjustable RF tuning circuit. 4,698,595, Cl. 324-313.000.

Rose, David; Maak, Norbert; and Lieske, Edgar, to Henkel Kommanditgesellschaft auf Aktien. Amine oxidation dye hair treating compositions. 4,698,066, Cl. 8-408.000.

Rose, James N. Protective covering for an adult and child during feeding of the child. 4,697,287, Cl. 2-49.000.

Rose, William H.: *See*—
Galloway, Michael D.; Rose, William H.; and Shaffer, David T., 4,697,863, Cl. 439-544.000.

Rosenthal, Lewis H.: *See*—
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.

Ross, David P., to Westinghouse Electric Corp. Electromagnetic projectile launcher with explosive-start and plasma drive. 4,698,532, Cl. 310-12.000.

Ross, Edgar: *See*—
Straka, Robert; Ross, Edgar; and Vanderveer, Fred, 4,698,228, Cl. 426-446.000.

Ross, Gerald F.: *See*—
Lamensdorf, David; Robbins, Kenneth W.; and Ross, Gerald F., 4,698,633, Cl. 342-42.000.

Ross, Robert E.: *See*—
Thulin, Robert; Ross, Robert E.; and Polifroni, Nicholas, 4,698,000, Cl. 425-133.100.

Roth, Emile M: *See*—
Bernard, Thomas E.; Roth, Emile M; Mohan, Edwin R.; Sherwin, Gary W.; and Zomp, John M., 4,697,598, Cl. 128-731.000.

Rottmayr, Hans: *See*—
Artzt, Peter; Rottmayr, Hans; and Bauer, Wolfgang, 4,697,411, Cl. 57-401.000.

Roy, Glenn M.: *See*—
Barnett, Ronald E.; Zanno, Paul R.; and Roy, Glenn M., 4,698,231, Cl. 426-548.000.

Royal Master Systems, Inc.: *See*—
Curry, Martin W., 4,697,704, Cl. 206-444.000.

Ruan, Incorporated: *See*—
Giles, William L., 4,697,844, Cl. 296-203.000.

Rub, Josef: *See*—
Dantlgraber, Jorg; Budel, Josef; and Rub, Josef, 4,697,990, Cl. 417-204.000.

Rubin, Jim. Storage box for boat. 4,698,042, Cl. 446-75.000.

Rude, Edward T., to General Clutch Corporation. Tilt mechanism for venetian blinds. 4,697,630, Cl. 160-177.000.

Rudell, Elliot: *See*—
Rudell, Elliot A.; Cernansky, Joseph S.; and Foster, George T., 4,697,812, Cl. 273-86.00B.

Rudell, Elliot A.; Cernansky, Joseph S.; and Foster, George T., to Rudell, Elliot. Off-road slot car and track system. 4,697,812, Cl. 273-86.00B.

Rudolph, Dieter, to Trutzschler GmbH & Co. KG. Dual chute fiber tuft feeding apparatus. 4,697,309, Cl. 19-105.000.

Rugland, Larry D.: *See*—
Eastman, Robert A.; Rugland, Larry D.; and Monsrud, Edwin M., 4,697,665, Cl. 180-230.000.

Ruijten, Henri M.; De Bree, Hans; and Van Amsterdam, Peter H., to Duphar International Research B.V. Device for concentrating solutions. 4,697,428, Cl. 62-124.000.

Rumignani, Paolo: *See*—
Billet, Rene ; Rumignani, Paolo; and Chasseguet, Gustave, 4,698,045, Cl. 464-68.000.

Runavot, Yves; Thiot, Andre ; and Salvetat, Jacques. Resinous copolymer composition based on hydrocarbons and their use in adhesives. 4,698,405, Cl. 526-347.000.

Rundle, Kenneth P. Variable speed tractor transmission and single lever control. 4,698,048, Cl. 474-27.000.

Ruopsa, Jon A. Particle collection system. 4,697,390, Cl. 51-270.000.

Russev, Koytcho Y.: *See*—
Gaydarov, Emanuil S.; Russev, Koytcho Y.; Paltchin, Vassil A.; and Stoilov, Ivan T., 4,698,462, Cl. 191-59.100.

Ruzicka, Dennis E.: *See*—
Hardy, Richard; Neumann, Frank D.; and Ruzicka, Dennis E., 4,697,764, Cl. 244-137.400.

Ryan, James W.; and Chung, Alfred, to University of Miami. Antihypertensive agents. 4,698,355, Cl. 514-362.000.

Ryan, James W.; and Chung, Alfred, to University of Miami. Antihypertensive agents. 4,698,356, Cl. 514-362.000.

Ryan, Thomas G., to Cyclops Corporation. Universal deck. 4,697,399, Cl. 52-303.000.

Ryll, Jurgen H.; and Ullrich, Rainer W., to AMP Incorporated. Connector having rotatable insert for retaining terminals. 4,698,030, Cl. 439-752.000.

Ryobi Limited: *See*—
Aoki, Atsuhito, 4,697,760, Cl. 242-220.000.
Saada, Robert: *See*—
Le Bret, Lucien F.; and Saada, Robert, 4,697,972, Cl. 413-6.000.
Saada, Serge: *See*—
Leprince, Philippe; Marec, Jean; Saada, Serge; Bloyet, Emile; and Migne, Jacques, 4,698,822, Cl. 372-70.000.
Sachtler GmbH Filmtechnische Gerate: *See*—
Jaumann, Leonhard; and Kus, Helmut, 4,697,773, Cl. 248-162.100.
Saeki, Yasuo: *See*—
Hayashi, Keijiro; Shinya, Kenzo; Saeki, Yasuo; and Asai, Shigeru, 4,697,820, Cl. 280-609.000.
Saeki, Yukio; Inoue, Naomitsu; and Tokunaga, Yukio, to Sumitomo Durez Company, Ltd. Production of phenolic resin composite foam. 4,698,370, Cl. 521-128.000.
Safarik, C. Robert: *See*—
Shepherd, Richard C.; and Safarik, C. Robert, 4,697,291, Cl. 8-151.000.
Safariland Ballistics, Inc.: *See*—
Sylvester, William, 4,697,285, Cl. 2-2.500.
Safe-T-Jack, Inc.: *See*—
Arzouman, Harry H., 4,697,788, Cl. 254-8.00B.
Saffa S.p.A.: *See*—
Albanesi, Giancarlo; and Rinaldi, Gianfranco, 4,698,215, Cl. 423-274.000.
Safinco Coordination Center N.V.: *See*—
Dijkstra, Albert J.; and Van Opstal, Martin, 4,698,185, Cl. 260-403.000.
Saikawa, Isamu: *See*—
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, to Eisai Co., Ltd. 3-(pyrrolidinio)methyl-3-cephem derivatives. 4,698,336, Cl. 514-202.000.
Saito, Masanori: *See*—
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.
Saito, Tadao; and Ogawa, Riichi, to Yoshino Kogyosho Co., Ltd. Method for designing and making a tapping stopper. 4,697,722, Cl. 222-571.000.
Saitou, Masami: *See*—
Tanemura, Mitsuru; Matsunaga, Isao; and Saitou, Masami, 4,698,364, Cl. 514-563.000.
Sakaguchi, Yoshikazu: *See*—
Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, 4,697,474, Cl. 74-733.000.
Sakai, Hirou; and Kawamura, Toshihide, to Stanley Electric Co., Ltd. Light-emitting diode. 4,698,730, Cl. 362-311.000.
Sakai, Masaaki: *See*—
Nishimura, Kazuhisa; Yoshihiro, Mitsugu; Sakai, Masaaki; and Hataoka, Seiichi, 4,698,703, Cl. 360-73.000.
Sakai, Yukio: *See*—
Kuramoto, Yukimasa; Oonishi, Hajimu; Sakai, Yukio; Hayashi, Yoshiki; and Wells, Robert C., 4,697,913, Cl. 355-3.00R.
Sakakibara, Shinsuke: *See*—
Nakashima, Seiichiro; Toyoda, Kenichi; Sakakibara, Shinsuke; and Torii, Nobutoshi, 4,697,979, Cl. 414-786.000.
Toyoda, Kenichi; Sakakibara, Shinsuke; Mizuno, Tooru; and Hara, Ryuichi, 4,698,777, Cl. 364-513.000.
Sakamoto, Hitoshi; and Okafuji, Takayuki, to Sony Corporation. Head positioning signal generating apparatus with signal duration control. 4,698,699, Cl. 360-10.200.
Sakuma, Tatsuya: *See*—
Ono, Katsuhiro; Sakuma, Tatsuya; and Takahashi, Hiroshi, 4,698,835, Cl. 378-136.000.
Sakura, Yasuhiro; Haraga, Koichi; Nimura, Hitoshi; and Ishikawa, Mamoru, to Tokyo Electric Co., Ltd. Multi-tint thermal printing apparatus control system. 4,697,938, Cl. 400-120.000.
Salancy, William: *See*—
Fassman, Arnold; and Salancy, William, 4,697,517, Cl. 101-348.000.
Saleh, Yousef: *See*—
Crane, Jacob; Muench, George J.; Saleh, Yousef; and Lin, Lifun, 4,698,140, Cl. 204-146.000.
Salerno, Catherine E., to National Starch and Chemical Corporation. Thermoplastic elastic adhesive containing polyether block amides. 4,698,242, Cl. 427-208.200.
Salewski, Helmut. Holding tank for waste fluids and process for disposing of waste fluids from recreational vehicles. 4,697,609, Cl. 137-1.000.
Salvetat, Jacques: *See*—
Runavot, Yves; Thiot, Andre ; and Salvetat, Jacques, 4,698,405, Cl. 526-347.000.
Salzmann, Ferdinand F.: *See*—
Wenkman, Gregory J.; and Salzmann, Ferdinand F., 4,697,780, Cl. 248-558.000.
Sampson, Harold J.: *See*—
Heys, George, Jr.; Aleshire, Rex A.; and Sampson, Harold J., 4,698,707, Cl. 360-99.000.
Sampson, Peter F.: *See*—
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.
Sandberg, Chester L., to Raychem Corporation. Method of monitoring a heater for faults. 4,698,583, Cl. 324-546.000.
Sandberg, Glenn A., to Formax, Inc. Patty molding mechanism for whole fiber food product. 4,697,308, Cl. 17-32.000.
Sanden Corporation: *See*—
Hatakeyama, Hideharu; and Takahashi, Hidenao, 4,697,992, Cl. 417-269.000.
Ishiki, Naotsugu; and Takei, Yuji, 4,697,420, Cl. 60-517.000.
Sandman, Daniel J.: *See*—
Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., 4,698,121, Cl. 156-622.000.
Sandoz Ltd.: *See*—
Macher, Ingolf; and Unger, Frank M., 4,698,331, Cl. 514-25.000.
Sangamo Weston, Inc.: *See*—
Larsen, James W.; and Campbell, Daniel P., 4,698,522, Cl. 307-309.000.
Sankyo Company, Limited: *See*—
Matsueda, Rei; Yabe, Yuichiro; Yamazaki, Mitsuo; Kokubu, Tatsuo; and Hiwada, Kunio, 4,698,329, Cl. 514-18.000.
Sannomiya, Hitoshi; and Hijikigawa, Masaya, to Sharp Kabushiki Kaisha. Amorphous semiconductor device. 4,698,658, Cl. 357-30.000.
Sano, Hiroshi: *See*—
Haruta, Masatake; Sano, Hiroshi; and Kobayashi, Tetsuhiko, 4,698,324, Cl. 502-243.000.
Sano, Norio: *See*—
Furukawa, Toshiharu; Shimura, Susumu; Takai, Fumio; Sano, Norio; and Ishida, Tomonobu, 4,697,532, Cl. 110-346.000.
Sanshin Kogyo Kabushiki Kaisha: *See*—
Watanabe, Eifu; and Yamazaki, Toshiyuki, 4,698,037, Cl. 440-78.000.
Sansome, Dennis H.; and Jones, Gerald M., to National Research Development Corporation. Plug drawing of tubes and other hollow items. 4,697,447, Cl. 72-283.000.
Santilli, Donald S.; Long, John J.; and Lewis, Robert T., to Chevron Research Company. Highly active and highly selective aromatization catalyst. 4,698,322, Cl. 502-74.000.
Santrade Limited: *See*—
Oskarsson, Rolf G.; and Von Holst, Johan P., 4,698,205, Cl. 419-5.000.
Sanyo Electric Co., Ltd.: *See*—
Itani, Kiyoshi; Tokizaki, Hisashi; Funagoshi, Tomohide; Ohtsuka, Nobuo; Ohkubo, Katsuhiro; and Katsuki, Hikaru, 4,698,744, Cl. 364-140.000.
Kan, Yuji; and Iwaki, Hiroshi, 4,697,803, Cl. 271-127.000.
Sanz, Ernst; Steger, Jean P.; and Thie, Werner, to Sanz, Ernst. Apparatus for cardiogoniometry. 4,697,597, Cl. 128-699.000.
SAPHYR S.A.R.L.: *See*—
Grinda, Francoise; and Gueyne, Jean, 4,698,222, Cl. 421-195.000.
Sara Lee Corporation: *See*—
Edson, Sydney, 4,697,776, Cl. 248-311.200.
Sarin, Vinod K.: *See*—
Buljan, Sergei-Tomislav V.; Lingertat, Helmut; Baldoni, J. Gary; and Sarin, Vinod K., 4,698,266, Cl. 428-457.000.
Sarton, Francois; and Roby, Gerard, to Legrand. Fastening device for attaching an object to a support. 4,697,774, Cl. 248-221.400.
Sartor, Leo, to Caber Italia S.p.A. Ski boot with self-powered ski boot control devices. 4,697,360, Cl. 36-2.600.
Sasaki, Hiroaki: *See*—
Nakase, Koji; and Sasaki, Hiroaki, 4,698,490, Cl. 235-472.000.
Sasaki, Kan; Takimura, Keisuke; and Katayama, Nobuaki, to Toyota Jidosha Kabushiki Kaisha. Power transfer device for four-wheel drive. 4,697,470, Cl. 74-701.000.
Sasaki, Kiichi; Tabata, Hiroshi; Okuhara, Hisakazu; and Higuchi, Kazuo, to Honda Giken Kogyo Kabushiki Kaisha. Seat belt device for a vehicle. 4,697,827, Cl. 280-808.000.
Sasaki, Noboru: *See*—
Ichijima, Seiji; and Sasaki, Noboru, 4,698,297, Cl. 430-383.000.
Sasaki, Yoshiyuki; and Kasaoka, Katsuyuki, to Teijin Limited. Polyester yarn. 4,698,260, Cl. 428-399.000.
Sasaoka, Hiroshi: *See*—
Inagaki, Takafumi; Sasaoka, Hiroshi; Masutomi, Susumu; Itoh, Hiroshi; and Takada, Mitsuru, 4,698,764, Cl. 364-424.100.
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, to Bayer Aktiengesellschaft. 1-Heteroaryl-4-aryl-pyrazolin-5-ones for use as medicaments. 4,698,344, Cl. 514-275.000.
Sassier, Pierre, to Thomson CSF. Temperature-compensated pressure controller, operationally reliable extinguisher provided with such a pressure controller and process for filling such a pressure controller. 4,697,643, Cl. 169-23.000.
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., to Motorola, Inc. Console interface for a trunked radio system. 4,698,805, Cl. 370-97.000.
Satake, Toshihiko: *See*—
Kikuchi, Uhee; Nozaki, Hiroyoshi; Fukuda, Masao; and Satake, Toshihiko, 4,698,005, Cl. 425-163.000.
Sato, Hiroshi: *See*—
Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, 4,698,646, Cl. 346-76.0PH.
Sato, Isao: *See*—
Yoshikawa, Seiji; Sato, Isao; Nakayama, Shigenori; and Amazaki, Mitsuhiro, 4,697,498, Cl. 91-420.000.

Sato, Kei: *See*—
Ito, Masahiro; Murayama, Noboru; Suziku, Koichi; Sato, Kei; and Sato, Tsutomu, 4,698,778, Cl. 364-518.000.
Suzuki, Koichi; Murayama, Noboru; Ito, Masahiro; and Sato, Kei, 4,698,691, Cl. 358-283.000.

Sato, Ken-ichi: *See*—
Ishihara, Joo; Ogawa, Toshio; Era, Masashi; and Sato, Ken-ichi, 4,697,320, Cl. 29-132.000.

Sato, Tsutomu: *See*—
Ito, Masahiro; Murayama, Noboru; Suziku, Koichi; Sato, Kei; and Sato, Tsutomu, 4,698,778, Cl. 364-518.000.

Sato, Yasuhisa; Yamada, Yasuyuki; Nakayama, Hiroki; and Oizumi, Kouji, to Canon Kabushiki Kaisha. Beam splitter for changing optical paths small tilt. 4,697,882, Cl. 350-287.000.

Sato, Yoshihisa: *See*—
Kohata, Toshihide; Miyazaki, Masaru; Sato, Yoshihisa; and Ikeda, Junichi, 4,697,408, Cl. 57-264.000.

Sato, Yoshimitsu; Ohtsuka, Shuichi; Kimura, Akinori; Yoda, Akira; Kato, Keishi; and Takahashi, Isoji, to Fuji Photo Film Co., Ltd. Process head for electrophotographic apparatus. 4,697,912, Cl. 355-3.00R.

Sato, Yoshitsugu; and Furukawa, Satoshi, to Brother Kogyo Kabushiki Kaisha. Coordinate-data input device for CRT display having cursor travel control means. 4,698,626, Cl. 340-710.000.

Satoh, Osamu, to Mazda Motor Corporation. Boom positioning apparatus for rock drill. 4,698,570, Cl. 318-568.000.

Satoh, Tetsuo: *See*—
Toya, Tomohiro; Hara, Hajime; Iida, Shigeki; and Satoh, Tetsuo, 4,698,397, Cl. 525-437.000.

Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, to Nippon Kogaku K. K. Thermal transfer recording system. 4,698,646, Cl. 346-76.0PH.

Satra, Stephen E.: *See*—
Mackie, Gregory C.; Satra, Stephen E.; and Chen, Chih-Ming, 4,698,842, Cl. 381-1.000.

Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, to Godecke Aktiengesellschaft. Use of 1,6-naphthyridinone derivatives in treating pulmonary thrombosis. 4,698,341, Cl. 514-230.000.

Sauk, John J.; and Van Kampen, Craig L., to University of Minnesota, Regents of the; and Minnesota Mining and Manufacturing Company. Composition and method for osseous repair. 4,698,326, Cl. 514-7.000.

Sauvageau, Guy; and Sauvageau, Marcel. Tool for archery bow cushion plunger and for arrow nocks. 4,697,323, Cl. 29-264.000.

Sauvageau, Marcel: *See*—
Sauvageau, Guy; and Sauvageau, Marcel, 4,697,323, Cl. 29-264.000.

Sauvestre, Gerard D.: *See*—
Espagnacq, Andre; and Sauvestre, Gerard D., 4,697,521, Cl. 102-334.000.

Sawada, Hiroshi; and Murai, Toshimi, to Toyota Jidosha Kabushiki Kaisha. Air-fuel ratio control system of internal combustion engine. 4,697,567, Cl. 123-489.000.

Sawamoto, Hirokazu: *See*—
Kayane, Yutaka; Sawamoto, Hirokazu; Omura, Takashi; and Harada, Naoki, 4,698,421, Cl. 534-642.000.

Sawano, Kazumi: *See*—
Okazaki, Kenichi; Morimoto, Kunio; Sawano, Kazumi; and Aoki, Masami, 4,698,755, Cl. 364-519.000.

Sawant, Ulhas S.; Karra, Vijia K.; and Kaja, Dean M., to Rexnord Inc. Method and apparatus for high performance conical crushing. 4,697,745, Cl. 241-30.000.

Sawyer, William D., Jr.: *See*—
Sawyer, William D., Sr.; and Sawyer, William D., Jr., 4,697,728, Cl. 226-196.000.

Sawyer, William D., Sr.; and Sawyer, William D., Jr. Paper web spreading shoe. 4,697,728, Cl. 226-196.000.

Saxby, Michael E., to Hilvenna Limited. Compressed gas powered ammunition for guns. 4,697,523, Cl. 102-440.000.

Sayles, David C., to United States of America, Army. Method for the manufacture of oxidizers of very large surface area and their use in high burning rate propellants. 4,698,106, Cl. 149-7.000.

Scala, Carl, to Halliburton Company. Method and apparatus for determining clay counter-ion concentration in shaly sands. 4,698,500, Cl. 250-256.000.

Scarrow, Robert C.: *See*—
Raymond, Kenneth N.; Scarrow, Robert C.; and White, David L., 4,698,431, Cl. 546-298.000.

Schabel, Amelia A.: *See*—
Nagarajan, Ramakrishnan; and Schabel, Amelia A., 4,698,327, Cl. 514-8.000.

Schaefer, Andreas: *See*—
Fehr, Erwin; and Schaefer, Andreas, 4,697,893, Cl. 350-516.000.

Schaefer, Suzanne E.: *See*—
Murray, Lee J.; and Schaefer, Suzanne E., 4,698,247, Cl. 428-35.000.

Schafer, Hartmut. Speed bumps for roadways. 4,697,294, Cl. 14-69.500.

Schaller, Donald L. Life spotting distress signal package. 4,697,706, Cl. 206-573.000.

Schallmeier, Gunter; and de Vries, Gerhard, to Continental Gummi-Werke Aktiengesellschaft. Unvulcanized tread strip for pneumatic vehicle tires. 4,698,245, Cl. 428-33.000.

Schalueck, Klaus: *See*—
Hertweck, Gernot; Kappis, Fritz; Kellermann, Guenter; and Schalueck, Klaus, 4,697,569, Cl. 123-568.000.

Schaus, John M.; and Titus, Robert D., to Eli Lilly and Company. Octahydro-oxazolo[4,5-g]quinolines derivatives and decahydro quinoline intermediates and their use as dopamine D-2 agonists. 4,698,347, Cl. 514-293.000.

Scheffer, Daniel G.; and Brock, Marilyn A., to Ohaus Scale Corporation. Toggle-type adjustable mounting for weighing scale flexures. 4,697,658, Cl. 177-229.000.

Scheffer, Terry J.: *See*—
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., 4,697,884, Cl. 350-334.000.

Scheid, William J. Electrical safety drop disconnect. 4,698,717, Cl. 361-1.000.

Schering Aktiengesellschaft: *See*—
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., 4,698,396, Cl. 525-420.500.
Schrader, Rolf; and Schroeer, Ulrich, 4,698,437, Cl. 556-171.000.

Scheurenbrand, Dieter: *See*—
Kleineberg, Wolfgang; and Scheurenbrand, Dieter, 4,697,612, Cl. 137-39.000.

Scheurer, Friedrich: *See*—
Zollmeyer, Willi; and Scheurer, Friedrich, 4,697,662, Cl. 180-71.000.

Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, to Arc Technologies Systems Ltd. Protective coating of temperature resistant materials for the metal shaft of combination electrodes for the electric steel production. 4,698,825, Cl. 373-93.000.

Schiff, Peter, to IABP Corporation. Percutaneous intra-aortic balloon and method for using same. 4,697,573, Cl. 128-1.00D.

Schiffers, Ulrich, to Kraftwerk Union Aktiengesellschaft. Combined gas and steam-turbine power generating station. 4,697,415, Cl. 60-39.120.

Schindler, Frederick J., to Rohm and Haas Company. Binder for high solids ambient cure coatings. 4,698,385, Cl. 524-733.000.

Schippers, Heinz; Gerhartz, Seigmar; and Kalthoff, Rolf, to Barmag AG. Stepped precision winding process. 4,697,753, Cl. 242-18.100.

Schlumberger Technology Corporation: *See*—
Kurkjian, Andrew L.; and Chang, Shu-Kong, 4,698,792, Cl. 367-31.000.
Wu, Peter, 4,698,793, Cl. 367-32.000.

Schmadel, Donald C., Jr.; and Culver, William H., to Chevron Research Company. Frequency shifted cavity for electromagnetic radiation. 4,697,888, Cl. 350-358.000.

Schmid, Eckhardt: *See*—
Andrei-Alexandru, Marcel; Kofink, Wolfgang; Schmid, Eckhardt; and Tietz, Volker, 4,698,560, Cl. 318-54.000.

Schmid, Hermann, to Texas Instruments Incorporated. Injection mold for producing the housings of integrated circuits. 4,697,784, Cl. 249-119.000.

Schmidberger, Rainer; and Hardtle, Sylvia. Sintering process. 4,698,096, Cl. 75-248.000.

Schmidgen, Hans: *See*—
Bernhardt, Siegfried; and Schmidgen, Hans, 4,697,311, Cl. 19-161.100.

Schmidt, Hans U.: *See*—
Werner, Frank; Marx, Matthias; and Schmidt, Hans U., 4,698,371, Cl. 521-131.000.

Schmidt, Karl-Heinz; and Feller, Wolfgang, to Intermedicat GmbH. Allosteric conjugates of hemoglobin and use as blood substitutes. 4,698,387, Cl. 525-54.100.

Schmidt, Kenneth J. Costume jewelry circlet. 4,697,436, Cl. 63-3.000.

Schmidt, Kurt: *See*—
Brenner, Heinz; Meyer, Heinrich; and Schmidt, Kurt, 4,697,794, Cl. 267-195.000.

Schmitt, Hans-Georg: *See*—
Beck, Gunther; Reinecke, Paul; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,698,357, Cl. 514-370.000.

Schmitt, Volker: *See*—
Goehle, Rolf; Schmitt, Volker; Bruckner, Werner; and Greefe, Klaus, 4,698,609, Cl. 335-255.000.

Schneider, Rolf: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Hettche, Albert; Schneider, Rolf; and Raubenheimer, Hans-Juergen, 4,698,174, Cl. 252-174.240.

Schneider, Wesley C., to Tootsie Roll Industries, Inc. Shipping container. 4,697,699, Cl. 206-44.110.

Schneller, Alfred K., to Centre National d'Etudes Spatiales. Motor involving the control of the mixture ratio of fuel and oxidizer for a liquid fuel motor by measuring flows, and control systems for carrying out this process. 4,697,416, Cl. 60-240.000.

Schnettler, Richard A.; Jones, Winton D., Jr.; and Claxton, George P., to Merrell Dow Pharmaceuticals Inc. Cardiotonic heterocyclic oxazolones. 4,698,353, Cl. 514-340.000.

Schnipke, Dennis E., to Premier Industrial Corporation. Adjustable and securable fluid pipe joint and nozzle coupling unit. 4,697,742, Cl. 239-587.000.

Schoening, Josef: *See*—
Ehlers, Claus; and Schoening, Josef, 4,698,203, Cl. 376-343.000.

Scholz, Helmut, to Daimler-Benz Aktiengesellschaft. Spring-loaded parking brake and service-brake system for trailers. 4,697,852, Cl. 303-7.000.

Scholz, Helmut, to Daimler-Benz Aktiengesellschaft. Pressure-medium braking system for vehicles. 4,697,853, Cl. 303-7.000.

Schoneberger, Joachim: *See*—
Welschof, Hans-Heinrich; and Schoneberger, Joachim, 4,698,047, Cl. 464-145.000.

Schrader, Dieter: *See*—
Hoeffkes, Horst; and Schrader, Dieter, 4,698,065, Cl. 8-406.000.

Schrader, Rolf; and Schroeer, Ulrich, to Schering Aktiengesellschaft. Alkali metal dialkylaluminum dihydrides and solutions thereof in aromatic hydrocarbons. 4,698,437, Cl. 556-171.000.

Schroeder, Guenther: *See*—
Ude, Werner; Besecke, Siegmund; Riemann, Achim; and Schroeder, Guenther, 4,698,448, Cl. 568-14.000.

Schroeer, Ulrich: *See*—
Schrader, Rolf; and Schroeer, Ulrich, 4,698,437, Cl. 556-171.000.

Schubert & Salzer: *See*—
Artzi, Peter; Rottmayr, Hans; and Bauer, Wolfgang, 4,697,411, Cl. 57-401.000.
Billner, Werner, 4,697,410, Cl. 57-401.000.
Handschuch, Karl; and Bock, Erich, 4,697,409, Cl. 57-401.000.

Schuett, Uwe: *See*—
Straehle, Wolfgang; Marx, Matthias; and Schuett, Uwe, 4,698,410, Cl. 528-76.000.

Schultz, Warren J., to Motorola, Inc. Overvoltage and overtemperature protection circuit. 4,698,655, Cl. 357-23.400.

Schulz, Gerd; and Hartleif, Hans-Peter, to Gerd Schulz Fahrzeug- und Container- Technik. Container lock. 4,697,967, Cl. 410-82.000.

Schwartz, Abraham; Williams, Joel; and Stevens, Robert D., to Becton, Dickinson and Company. Fluorescently labeled microbeads. 4,698,262, Cl. 428-402.000.

Schwartz, Leonard: *See*—
Mead, James B.; Bevan, Robert; and Schwartz, Leonard, 4,698,639, Cl. 343-756.000.

Schwartz, Morris; and Kaprelian, Edward K. Video conversion kit for projectors. 4,698,683, Cl. 358-214.000.

Schwarz, Frederick M.: *See*—
Brown, Wayne M.; Neal, William F.; and Schwarz, Frederick M., 4,697,981, Cl. 415-104.000.

Schwarz, Waldemar: *See*—
Howe, Michael; and Schwarz, Waldemar, 4,697,696, Cl. 198-822.000.

Scientific Atlanta, Inc.: *See*—
Mobley, Joseph G.; and Womble, David P., 4,698,598, Cl. 329-134.000.

Scott, Menzy. Lawn debris accumulation and collection apparatus. 4,697,834, Cl. 294-55.000.

Scott, Menzy. Combined lawn debris receptacle-target apparatus. 4,697,835, Cl. 294-55.000.

Scovill Japan Kabushiki Kaisha: *See*—
Otsuka, Koji, 4,697,313, Cl. 24-95.000.

Sealfon, Andrew I. Hypodermic syringe. 4,698,055, Cl. 604-82.000.

Seidler, Jack, to North American Specialties Corp. Edge clip and terminal. 4,697,865, Cl. 439-861.000.

Seiko Seiki Kabushiki Kaisha: *See*—
Ishizawa, Tadao; Kotaka, Hirofumi; and Kakinuma, Masami, 4,697,994, Cl. 418-8.000.

Seikosha Co., Ltd.: *See*—
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, 4,697,908, Cl. 354-439.000.

Seiscor Technologies, Inc.: *See*—
Dively, Lee V.; and Grubbs, Jack M., 4,698,840, Cl. 379-112.000.

Seki, Yoichi: *See*—
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, 4,697,908, Cl. 354-439.000.

Sekiguchi, Kyoji; and Kohayamawa, Yoshimi, to Canon Kabushiki Kaisha. Automatic optometer. 4,697,895, Cl. 351-243.000.

Sekine, Kazumi: *See*—
Nishimuro, Yoshiaki; Hirata, Osamu; Kano, Kuniomi; Miyakawa, Akira; Fushimoto, Hideo; and Sekine, Kazumi, 4,698,783, Cl. 364-710.000.

Sekine, Noboru: *See*—
Nishimura, Sadanori; and Sekine, Noboru, 4,697,475, Cl. 74-866.000.

Sekisui Kaseihin Kogyo Kabushiki Kaisha: *See*—
Ikeda, Toshiki; Beppu, Yoshitugu; Yamamoto, Takashi; Ishigaki, Hideyo; and Ohmura, Hiroshi, 4,698,367, Cl. 521-57.000.

Sekizawa, Hidekazu; Kawakami, Haruko; and Yamamoto, Naofumi, to Kabushiki Kaisha Toshiba. Color picture reader and method for operating the same. 4,698,669, Cl. 358-76.000.

Sekozawa, Teruji: *See*—
Ohnari, Mikihiko; Funabashi, Motohisa; Shioya, Makoto; Sekozawa, Teruji; and Shida, Masami, 4,697,566, Cl. 123-479.000.

Semco Instruments, Inc.: *See*—
Moore, M. Samuel, 4,698,454, Cl. 136-233.000.

Semon, Joseph R., to Casket Shells, Inc. Burial casket with identification capsule. 4,697,316, Cl. 27-1.000.

Sensormedics Corporation: *See*—
Bachman, Thomas E.; McDavid, Larry S.; and Trueblood, David M., 4,697,450, Cl. 73-23.000.

Sepai, Dinyar, to Crosfield Electronics (USA) Limited. Method of operating radiation sensors. 4,698,515, Cl. 250-578.000.

Sergero, Tommy S.: *See*—
Madsen, Henning S.; Sergero, Tommy S.; and Johansson, Karl A., 4,697,334, Cl. 29-594.000.

Serizawa, Mitsuya: *See*—
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,697,816, Cl. 280-91.000.

Serotonin Industries of Charleston: *See*—
Crosby, Martin G., 4,698,342, Cl. 514-253.000.

Serrander, Hans R., to Telefonaktiebolaget L M Ericsson. Apparatus for mutually aligning the ends of two optical fibres that are to be connected. 4,697,872, Cl. 350-96.210.

Service National Electricite de France: *See*—
Masse, Jean, 4,698,201, Cl. 376-298.000.

Seuter, Friedel: *See*—
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.

Severijns, Adrianus P.; Severin, Petrus J. W.; and Van Bommel, Cornelus H. M., to U.S. Philips Corporation. Method of manufacturing a passive fiber optic component. 4,698,084, Cl. 65-3.110.

Severin, Petrus J. W.: *See*—
Severijns, Adrianus P.; Severin, Petrus J. W.; and Van Bommel, Cornelus H. M., 4,698,084, Cl. 65-3.110.

Severns, Richard R.: *See*—
Finley, Joseph H.; Severns, Richard R.; and Zakotnik, Robert M., 4,698,067, Cl. 44-15.00B.

Seyfried, Christoph: *See*—
Hausberg, Hans-Heinrich; Bottch, Henning; Gottschlich, Rudolf; Seyfried, Christoph; and Minck, Klaus-Otto, 4,698,351, Cl. 514-338.000.

Seymour, Robert A.; Ritter, Allen M.; Kellogg, Richard A.; and D'Atre, John D., to General Electric Company. Method of digital flux reconstruction with DC elimination. 4,698,577, Cl. 318-805.000.

SFENA-Societe Francaise d'Equippements pour la Navigation Aereenne: *See*—
Thuy, Pham D.; and Vanypre, Dominique, 4,698,768, Cl. 364-521.000.

SGS Microelettronica S.p.A.: *See*—
Finaurini, Roberto, 4,698,720, Cl. 361-91.000.

SGS Microelettronica SpA: *See*—
Cini, Carlo; Diazzi, Claudio; and Erratico, Pietro, 4,698,519, Cl. 307-254.000.

Shafer, Jimmie G., to Mobay Corporation. Low viscosity oil based pesticide compositions. 4,698,362, Cl. 514-490.000.

Shaffer, David T.: *See*—
Galloway, Michael D.; Rose, William H.; and Shaffer, David T., 4,697,863, Cl. 439-544.000.

Shaffer, Jeremiah J.: *See*—
Keyes, Marion A., IV; and Shaffer, Jeremiah J., 4,697,980, Cl. 415-1.000.

Shai, Yechiel: *See*—
Patchornik, Abraham; Shai, Yechiel; and Pass, Shimeon, 4,698,208, Cl. 422-62.000.

Sharp Kabushiki Kaisha: *See*—
Koizumi, Satoru; Teshima, Daisuke; and Katayama, Yoshio, 4,698,704, Cl. 360-74.100.
Sannomiya, Hitoshi; and Hijikigawa, Masaya, 4,698,658, Cl. 357-30.000.
Watanabe, Masanori; and Hijikigawa, Masaya, 4,698,657, Cl. 357-25.000.

Shavlik, Robert J.: *See*—
Rajala, Gregory J.; and Shavlik, Robert J., 4,697,693, Cl. 198-699.000.

Shaw, Herbert J.: *See*—
Youngquist, Robert C.; Brooks, Janet L.; Fesler, Kenneth A.; Cutler, Cassius C.; and Shaw, Herbert J., 4,697,926, Cl. 356-345.000.

Sheets, Ronald E., to Tamarack Scientific Co., Inc. Method of heating semiconductor wafers in order to achieve annealing, silicide formation, reflow of glass passivation layers, etc. 4,698,486, Cl. 250-492.200.

Shelby, Richard K.; and Nutting, Robert G. Multi-station rotary blow molding machine. 4,698,012, Cl. 425-526.000.

Shell Oil Company: *See*—
Wong, Pui K., 4,698,394, Cl. 525-289.000.

Shell Western E&P Inc.: *See*—
Knowles, William T., Jr., 4,697,426, Cl. 62-48.000.

Shepherd, Richard C.; and Safarik, C. Robert. Carpet dyeing apparatus and method. 4,697,291, Cl. 8-151.000.

Shepley, Pete; Johnston, Richard; and Smith, Allan F., to Precision Shooting Equipment Company. Combination arrow quiver and sight support mount. 4,697,350, Cl. 33-265.000.

Sherwin, Gary W.: *See*—
Bernard, Thomas E.; Roth, Emile M; Mohan, Edwin R.; Sherwin, Gary W.; and Zomp, John M., 4,697,598, Cl. 128-731.000.

Sheu, Shan-Shan; Yang, Robert K.; and Corsello, Vincent, to Warner-Lambert Company. Soft-textured confectioner composition containing fiber. 4,698,232, Cl. 426-572.000.

Shibata, Izumi, to Kabushiki Kaisha Kenwood. Recording/reproducing apparatus. 4,698,776, Cl. 364-513.500.

Shibata, Takeo; and Nagasawa, Kazumasa, to Kabushiki Kaisha Okawaraseisakusho. Method and apparatus of controlling granulation of moisture-absorbing powder material. 4,698,190, Cl. 264-40.200.

Shibata, Toshihiro: *See*—
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Arata, Ryozo, 4,698,381, Cl. 524-100.000.

Shibuya, Hisao; and Yusa, Tsunero, to Kamui Company Ltd. Method of manufacturing baffles for shell and tube type heat exchangers. 4,697,321, Cl. 29-157.30R.

Shibuya Kogyo Co., Ltd.: *See*—
Nakai, Kimimoto; and Umezaki, Isao, 4,697,590, Cl. 128-396.000.

Shida, Masami: *See*—
Ohnari, Mikihiko; Funabashi, Motohisa; Shioya, Makoto; Sekozawa, Teruji; and Shida, Masami, 4,697,566, Cl. 123-479.000.

Shields, Charles E. Air discharge system for use with connector applying machines. 4,697,336, Cl. 29-753.000.

Shimadzu Corporation: *See—*
Akiyama, Osamu, 4,697,924, Cl. 356-333.000.
Shimamura, Takeo; Uchino, Hiroshi; and Kurosawa, Ryoichi, to Kabushiki Kaisha Toshiba. Reactive power compensation apparatus. 4,698,581, Cl. 323-211.000.
Shimaoka, Keiichi: *See—*
Sugiyama, Jun; Komatsubara, Hirofumi; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,697,460, Cl. 73-862.360.
Shimizu Construction Co. Ltd.: *See—*
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.
Shimizu, Katsumasa: *See—*
Shiraki, Manabu; Amano, Hiroyuki; Nishimura, Tomoaki; and Shimizu, Katsumasa, 4,698,535, Cl. 310-156.000.
Shimizu, Shigeo: *See—*
Fukuda, Yasutaka; Shimizu, Shigeo; and Nakano, Atsushi, 4,698,251, Cl. 428-64.000.
Shimomura, Hideo: *See—*
Okuda, Shuji; Shimomura, Hideo; Honda, Kusuo; Kawaguchi, Masato; Kuno, Yasuo; Kumagai, Takenori; and Kato, Nobuo, 4,697,397, Cl. 52-223.00R.
Shimozi, Kozi; and Teshima, Hitoshi, to Toyota Joshida Kabushiki Kaisha. Exhaust gas purifier with resistant circumferential sealing member between monolith catalyst and casing. 4,698,213, Cl. 422-179.000.
Shimura, Susumu: *See—*
Furukawa, Toshiharu; Shimura, Susumu; Takai, Fumio; Sano, Norio; and Ishida, Tomonobu, 4,697,532, Cl. 110-346.000.
Shin-Etsu Chemical Co., Ltd.: *See—*
Hida, Yoshinori; Meguriya, Noriyuki; and Yoshida, Akira, 4,697,877, Cl. 350-96.300.
Shindo, Yoshio: *See—*
Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, 4,697,474, Cl. 74-733.000.
Shinozaki, Kazuo: *See—*
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; and Takano, Takeshi, 4,698,320, Cl. 501-96.000.
Shinwa Seisakusho Co., Ltd.: *See—*
Takahashi, Yasuo, 4,697,851, Cl. 300-1.000.
Shinya, Kenzo: *See—*
Hayashi, Keijiro; Shinya, Kenzo; Saeki, Yasuo; and Asai, Shigeru, 4,697,820, Cl. 280-609.000.
Hayashi, Keijiro; Shinya, Kenzo; Awano, Toshimi; and Asai, Shigeru, 4,697,821, Cl. 280-609.000.
Shioura, Kozo; Yamazaki, Syuichi; and Shono, Hiroaki, to Nitto Boseki Co., Ltd. Method for producing glass fibers having non-circular cross sections. 4,698,083, Cl. 65-2.000.
Shioya, Makoto: *See—*
Ohnari, Mikihiko; Funabashi, Motohisa; Shioya, Makoto; Sekozawa, Teruji; and Shida, Masami, 4,697,566, Cl. 123-479.000.
Shirai, Toshio, to Sony Corporation. Air guide for tape copying apparatus. 4,698,700, Cl. 360-16.000.
Shiraishi, Ryoichi: *See—*
Nishiguchi, Yasuo; Yasutomi, Tsuyoshi; and Shiraishi, Ryoichi, 4,698,643, Cl. 346-76.0PH.
Shiraki, Manabu; Amano, Hiroyuki; Nishimura, Tomoaki; and Shimizu, Katsumasa, to Aisin Seiki Kabushiki Kaisha. Electric motor operated throttle valve. 4,698,535, Cl. 310-156.000.
Shitori, Yoshiyasu: *See—*
Ogasawara, Sadanori; Hanafusa, Takashi; Kariya, Katsuhide; Ito, Masayoshi; and Shitori, Yoshiyasu, 4,698,332, Cl. 514-42.000.
Sho, Ikuo: *See—*
Kimura, Yoshikazu; Sho, Ikuo; and Hatabe, Yukio, 4,698,569, Cl. 318-567.000.
Shoher, Itzhak; and Whiteman, Aharon E. Metal foil for forming a dental coping and crown. 4,698,021, Cl. 433-222.100.
Shono, Hiroaki: *See—*
Shioura, Kozo; Yamazaki, Syuichi; and Shono, Hiroaki, 4,698,083, Cl. 65-2.000.
Short, Thomas D.: *See—*
DeVaney, David B.; Harper, Donald J.; and Short, Thomas D., 4,698,839, Cl. 379-60.000.
Showscan Film Corporation: *See—*
Fox, Charles, 4,697,896, Cl. 352-180.000.
Shuey, John R.: *See—*
Hayes, Earl J.; Cooper, Ralph M.; Denlinger, Keith R.; and Shuey, John R., 4,697,864, Cl. 439-444.000.
Shumaker, Fred E.: *See—*
Key, Joe W.; and Shumaker, Fred E., 4,698,038, Cl. 441-5.000.
Shuttler, Philippe: *See—*
Boccadoro, Yves; and Shuttler, Philippe, 4,697,562, Cl. 123-339.000.
Shyu, Wen B.; Woodhead, David A.; and Quigley, Vincent P., to Standard Oil Company, The. Method of forming a nonaqueous stable emulsion of rubber in polymerizable monomer, and the polymerization process and thermoplastic copolymer produced thereby. 4,698,389, Cl. 525-96.000.
Sicomant AB Juteskarsgatan 38: *See—*
Bjorck, Conny; and Sigurdsson, Per A., 4,697,743, Cl. 241-5.000.
Sidell, James H.: *See—*
Cumming, Newell E.; and Sidell, James H., 4,698,074, Cl. 55-126.000.
Siegel, William J.: *See—*
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Siemens Aktiengesellschaft: *See—*
Brendl, Rudolf; Hahn, Alfred; and Weiss, Karl, 4,697,802, Cl. 269-323.000.
Erdel, Karlheinz, 4,698,813, Cl. 371-40.000.
Herkert, Hans; and Timmermann, Uwe, 4,698,628, Cl. 340-825.020.
Heynisch, Hinrich; and Huebner, Klemens, 4,698,818, Cl. 372-34.000.
Lekholm, Anders; and Amundson, David C., 4,697,591, Cl. 128-419.0PG.
Peppel, Joerg-Michael, 4,698,520, Cl. 307-633.000.
Reichenberger, Helmut, 4,697,588, Cl. 128-328.000.
Wessels, Gerd; and Rohwedder, Arnim, 4,697,579, Cl. 128-24.00A.
Sievers, Robert K.; Cooper, Martin H.; and Tupper, Robert B., to United States of America, Energy. Self-actuated nuclear reactor shutdown system using induction pump to facilitate sensing of core coolant temperature. 4,698,200, Cl. 376-233.000.
SIGRI GmbH: *See—*
Tetzlaff, Ernst, 4,698,189, Cl. 264-22.000.
Sigurdsson, Per A.: *See—*
Bjorck, Conny; and Sigurdsson, Per A., 4,697,743, Cl. 241-5.000.
Silberman, Gabriel M.: *See—*
Barzilai, Zeev; Iyengar, Vijay S.; and Silberman, Gabriel M., 4,698,830, Cl. 377-19.000.
Silbernagel, Raymond A.; and Funck, Gordon W., to Molex Incorporated. Low profile modular phone jack assembly. 4,698,025, Cl. 439-79.000.
Silvey, Frank C., to Mobil Oil Corporation. De-entrainment chimney and method of operation. 4,698,138, Cl. 203-91.000.
Silzle, Siegfried. Airplane hangar. 4,697,392, Cl. 52-65.000.
Simeth, Claus, to M.A.N.-Roland Druckmaschinen Aktiengesellschaft. Sheet gripper system for a printing press. 4,697,512, Cl. 101-142.000.
Simms, Robert A. Bioluminescent simulator and method. 4,697,374, Cl. 43-17.500.
Simon, Antoine: *See—*
Hirth, Antoine; and Simon, Antoine, 4,698,819, Cl. 372-38.000.
Simpson, William W.; and Fulton, Irvin G., to USM Corporation. Bag spreaders. 4,697,403, Cl. 53-551.000.
Sinclair, Richard G.; Benecke, Herman P.; and Sowell, Sylvester, to Idemitsu Petrochemical Co., Ltd. Method for the preparation of polyarylene sulfide with aqueous polyethylene glycol mixture. 4,698,415, Cl. 528-388.000.
Singer Company, The: *See—*
Mead, James B.; Bevan, Robert; and Schwartz, Leonard. 4.698.639, Cl. 343-756.000.
Singh, Anand P., to NRM Corporation. Tire curing press. 4,698,003, Cl. 425-52.000.
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Haigh, David G.; and Singh, Bhajan, 4,698,596, Cl. 328-127.000.
Sinter Limited: *See—*
Mino, Takeyasu; and Harada, Mitsuaki, 4,697,355, Cl. 34-41.000.
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Fachat, Gaston; Sistermann, Klaus; and Ungerer, Heinz-Jurgen, 4,698,086, Cl. 65-16.000.
Skachkov, Konstantin B.: *See—*
Kostylev, Alexandr D.; Plavskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., 4,697,647, Cl. 173-91.000.
SKF Mekanprodukter AB: *See—*
Karlsson, Ove; Ostling, Sture; and Adolfsson, Rune, 4,697,937, Cl. 384-486.000.
Skoda, Hans D.: *See—*
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., 4,698,396, Cl. 525-420.500.
Slavin, Sidney H. Spinning optics device. 4,698,564, Cl. 318-257.000.
Slayton, Danny L.: *See—*
Palm, Charles S.; Slayton, Danny L.; Lak, Khosrow; Sampson, Peter F.; Davis, David R.; Wheatley, Maurice S., Jr.; Chatham, Gregory A.; Jones, Wayne C.; Charles, Kirk W.; and Ireland, Anthony J., 4,697,920, Cl. 355-14.0CH.
Slik Tripod Co., Ltd.: *See—*
Kosugi, Yoshinobu; and Tachibana, Kaoru, 4,697,772, Cl. 248-183.000.
Slobodkin, Yefim, to Avery International Corporation. Apparatus for constant pressure diagonal-web crush-scoring. 4,698,052, Cl. 493-355.000.
Slovik, David M.: *See—*
Neer, Robert M.; Potts, John T., Jr.; and Slovik, David M., 4,698,328, Cl. 514-12.000.
Smabathavner a.s: *See—*
Creed, John, 4,697,539, Cl. 114-266.000.
Smahlik, Michael A., to Steccone Products Company, Inc. Squeegee. 4,697,296, Cl. 15-245.000.
SMC Metal Tech Co., Ltd.: *See—*
Yung, Simon K. C., 4,697,605, Cl. 134-107.000.
Smirnov, Vladimir N.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.
Smith, Allan F.: *See—*
Shepley, Pete; Johnston, Richard; and Smith, Allan F., 4,697,350, Cl. 33-265.000.
Smith, Francis E.; Hyatt, Robert L.; and Kline, Leonard J., Jr., to Ametek, Inc. Quiet by-pass vacuum motor. 4,698,534, Cl. 310-89.000.

Smith, Harry D., Jr., to Halliburton Company. Quantitative evaluation of uranium ore zones. 4,698,499, Cl. 250-256.000.
Smith, Richard G. Overload detection apparatus. 4,698,623, Cl. 340-665.000.
Smith, Stuart B.: *See*—
Storey, William R.; Wheat, William R.; Smith, Stuart B.; and Ajinkya, Milind B., 4,698,211, Cl. 422-135.000.
Smith, Suzann. Child's high chair restraining device. 4,697,849, Cl. 297-485.000.
Smith, Thomas C. Retractable line storage device. 4,697,537, Cl. 114-230.000.
Smith, Thomas L.: *See*—
Koch, G. Teryl; Smith, Thomas L.; Jacklin, Keith A.; and Hammond, James A., 4,698,252, Cl. 428-159.000.
SmithKline Beckman Corporation: *See*—
Hill, David T.; and Johnson, Randall K., 4,698,422, Cl. 536-17.100.
Smolik, Kenneth F.: *See*—
McPherson, Ross; Smolik, Kenneth F.; and Thomson, David J., 4,698,769, Cl. 364-724.000.
Smyth, Robert R., to Eaton Corporation. Automatic mechanical transmission control. 4,698,763, Cl. 364-424.100.
Snyder, Teddy R., to OI Forest Products STS Inc. Collapsible bulk shipping container with take-out front panel. 4,697,731, Cl. 229-23.00R.
So, Vincent C.; Hughes, Richard P.; and Vella, Paul J., to Northern Telecom Limited. Attenuator for optical fiber. 4,697,869, Cl. 350-96.150.
Sobti, Arun: *See*—
Sasuta, Michael D.; Rosenthal, Lewis H.; Mills, Donald C.; Marten, Russell A.; Kizior, David J.; Sobti, Arun; and Blankenship, Johnny E., 4,698,805, Cl. 370-97.000.
Societa' Cavi Pirelli S.p.A.: *See*—
Marin, Carlo; Lanfranconi, Gianmario; and Borroni, Andrea, 4,698,009, Cl. 425-196.000.
Parmigiani, Bruno; and Lanfranconi, Gianmario, 4,698,458, Cl. 174-73.00R.
Priaroggia, Paolo G., 4,697,875, Cl. 350-96.230.
Societa Italo-Brittanica L. Manetti-H. Roberts & Co.: *See*—
De Regis, Massimo; and Mannucci, Emanuela, 4,698,354, Cl. 514-357.000.
Societe Civile d'Investigations Pharmacologiques d'Aquitaine: *See*—
Masquelier, Jack, 4,698,360, Cl. 514-456.000.
Societe Cortial, S.A.: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Pontagnier, Henri; and Prat, Gisele, 4,698,343, Cl. 514-255.000.
Societe Nationale Industrielle et Aerospatiale: *See*—
Pineau, Didier, 4,698,255, Cl. 428-215.000.
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Ionescu, Dragos; and Soiman, Mihai, 4,697,570, Cl. 123-602.000.
Solar Turbines Incorporated: *See*—
Darragh, Charles T.; and Parsons, Edward L., Jr., 4,697,633, Cl. 165-51.000.
Solazzi, Michael C., to Chemplex Industries, Inc. Sample cup apparatus for use in x-ray spectroscopy employing selectively operated venting means. 4,698,210, Cl. 422-102.000.
Son, Pyong N.: *See*—
Lai, John T.; and Son, Pyong N., 4,698,446, Cl. 564-494.000.
Sony Corporation: *See*—
Collins, Mark C., 4,698,678, Cl. 358-148.000.
Collins, Mark C., 4,698,698, Cl. 360-10.100.
Kakizaki, Takehiro; and Araki, Shoji, 4,698,558, Cl. 315-383.000.
Kawada, Hideaki, 4,698,713, Cl. 360-132.000.
Kimura, Shuichi, 4,698,796, Cl. 369-44.000.
Kubota, Tatsuya; and Takanashi, Kenji, 4,698,676, Cl. 358-140.000.
Nishimura, Kazuhisa; Yoshihiro, Mitsugu; Sakai, Masaaki; and Hataoka, Seiichi, 4,698,703, Cl. 360-73.000.
Sakamoto, Hitoshi; and Okafuji, Takayuki, 4,698,699, Cl. 360-10.200.
Shirai, Toshio, 4,698,700, Cl. 360-16.000.
Sugawara, Kokichi; and Matsuzaka, Takayoshi, 4,698,714, Cl. 360-133.000.
Urayama, Kiyoshi, 4,697,702, Cl. 206-387.000.
Wada, Masaru; and Kato, Yoji, 4,698,122, Cl. 156-625.000.
Sorensen, Gerald R.: *See*—
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Southern Imperial, Inc.: *See*—
Valiulis, Stanley C., 4,697,712, Cl. 211-187.000.
Sowell, Sylvester: *See*—
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Soydan, Ramazan: *See*—
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Sozzi, Giuseppe: *See*—
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Sparkes, Wilford S. Wood screw. 4,697,969, Cl. 411-387.000.
Spartus Corporation: *See*—
Roberts, Patrick S.; and Weiss, Leonard, 4,697,930, Cl. 368-82.000.
Spears, Ronald K. Night loader for guns. 4,697,369, Cl. 42-89.000.
Specialty Manufacturing Company: *See*—
Wicker, James H., 4,697,541, Cl. 116-28.00R.
Spectra-Physics, Inc.: *See*—
Rando, Joseph F.; and Jones, Henry W., 4,698,479, Cl. 219-121.0LV.
Spectrolab, Inc.: *See*—
Cavicchi, Bruce T.; Dill, Hans G.; and Zemmrich, Dieter K., 4,698,455, Cl. 136-256.000.
Sperry Corporation: *See*—
Lamensdorf, David; Robbins, Kenneth W.; and Ross, Gerald F., 4,698,633, Cl. 342-42.000.
Sperti Drug Products, Inc.: *See*—
Danner, Michael E.; and Hieber, Thomas E., 4,698,166, Cl. 210-774.000.
Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., to HTC Corporation, The. Continuous solder system. 4,697,730, Cl. 228-37.000.
Spillert, Charles R.; Devereux, Corinne; and Lazaro, Eric J., to University of Medicine & Dentistry of New Jersey. Process for treating a warm-blooded animal to be subjected to radiotherapy. 4,698,335, Cl. 514-158.000.
Spooner, Anthony N.; and Lima-Marques, Luis, to Research Laboratories of Australia Pty. Ltd. Method of and means for testing flow properties of magnetic toners. 4,697,463, Cl. 73-866.000.
Spray-All, Inc.: *See*—
Chamberlin, Edward B.; Brown, Edward M.; and Towns, Edward J., 4,697,993, Cl. 417-514.000.
Spymark, Incorporated: *See*—
Cockerell, William C., Jr., 4,698,781, Cl. 364-561.000.
Srnsky, Randy A.: *See*—
Blackwelder, Ron F.; Gad-el-Hak, Mohamed; and Srnsky, Randy A., 4,697,769, Cl. 244-199.000.
Stacey, Eric J.: *See*—
Rodgers, Eugene L.; and Stacey, Eric J., 4,698,740, Cl. 363-89.000.
Stahl, Bernard; and Bohm, Horst, to Optima Spanntechnik GmbH. Clamping device. 4,697,800, Cl. 269-32.000.
Staines, Glyn: *See*—
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,697,718, Cl. 220-82.00R.
Stanbro, Michael: *See*—
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Standard Oil Company, The: *See*—
Shyu, Wen B.; Woodhead, David A.; and Quigley, Vincent P., 4,698,389, Cl. 525-96.000.
Standel, Philip R.: *See*—
Tye, Richard J.; Lauterbach, George E.; and Standel, Philip R., 4,698,172, Cl. 252-70.000.
Stanley Electric Co., Ltd.: *See*—
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Starkey, Cornelius J., IV: *See*—
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Steccone Products Company, Inc.: *See*—
Smahlik, Michael A., 4,697,296, Cl. 15-245.000.
Steckler, Steven A.: *See*—
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Steger, Jean P.: *See*—
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Foucher, Jean-Claude; and Devoucoux, Pierre, 4,697,634, Cl. 165-76.000.
Steinecker Maschinefabrik GmbH, Firma: *See*—
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Steinhauer, Jurgen; and Steiniger, Wolfgang, to Hauni-Werke Korber & Co. KG. Apparatus for building a stream of fibrous material. 4,697,603, Cl. 131-84.400.
Steiniger, Wolfgang: *See*—
Steinhauer, Jurgen; and Steiniger, Wolfgang, 4,697,603, Cl. 131-84.400.
Steinke, James A., to Durkee Industrial Foods, Corp. Particulate composition and process for making same. 4,698,264, Cl. 428-402.200.
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Brinkhoff, Helmut; Gloning, Gunter; and Steinkotter, Heinz-Gunter, 4,697,299, Cl. 15-323.000.
Stendal, Karl-Emil. Lock. 4,697,442, Cl. 70-97.000.
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Stephens, Donald L.: *See*—
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Stephenson, Leonard E.: *See*—
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Sterling Drug Inc.: *See*—
Daum, Sol J.; and Lesher, George Y., 4,698,350, Cl. 514-312.000.
Sternasty, Richard S.: *See*—
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Sterner, Rudolph J.: *See*—
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Stero Company, The: *See*—
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Stevens, Howard, Jr.: *See*—
Stevens, Keith A.; Stevens, Daniel R.; and Stevens, Howard, Jr., 4,697,544, Cl. 118-504.000.

Stevens, Keith A.; Stevens, Daniel R.; and Stevens, Howard, Jr. Disposable spray shield. 4,697,544, Cl. 118-504.000.

Stevens, Raymond R., Jr.; Beisel, Robert R.; and Griffiths, Stephen F., to Budd Company, The. Control system for transfer apparatus. 4,697,448, Cl. 72-405.000.

Stevens, Robert D.: *See*—
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Stewart, John; and Brown, George M., to Twiflex Limited. Brakepad assembly for disc brake. 4,697,671, Cl. 188-72.900.

Stewart, William S., to Phillips Petroleum Company. Method and device for controlling a delayed coker system. 4,698,313, Cl. 436-55.000.

Steyert, William A.: *See*—
Longsworth, Ralph C.; and Steyert, William A., 4,697,635, Cl. 165-147.000.

Stichting IWL: *See*—
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Stoiber, Henry E.: *See*—
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Stoilov, Ivan T.: *See*—
Gaydarov, Emanuil S.; Russev, Koytcho Y.; Paltchin, Vassil A.; and Stoilov, Ivan T., 4,698,462, Cl. 191-59.100.

Stone, Henry W., to Westinghouse Electric Corp. Kinematic parameter identification for robotic manipulators. 4,698,572, Cl. 318-568.000.

Stone, Roger R.: *See*—
Kerns, John A.; Stone, Roger R.; and Fabyan, Joseph, 4,698,197, Cl. 376-142.000.

Stopinc Aktiengesellschaft: *See*—
Fricker, Robert, 4,697,723, Cl. 222-600.000.

Stoppazzini, Benito, to E.M.M. Emiliana Macchine Maglieria S.r.l. Device for the disengageable locking of the last rows of knitted fabric in the needle working area of an automatic flat knitting machine. 4,697,439, Cl. 66-149.00R.

Storey, William R.; Wheat, William R.; Smith, Stuart B.; and Ajinkya, Milind B., to Exxon Chemical Patents Inc. Catalyst injection for Ziegler polymerization. 4,698,211, Cl. 422-135.000.

Straehle, Wolfgang; Marx, Matthias; and Schuett, Uwe, to BASF Aktiengesellschaft. Process for the preparation of high-temperature-resistant dense or cellular polyurethane elastomers. 4,698,410, Cl. 528-76.000.

Straka, Robert; Ross, Edgar; and Vanderveer, Fred, to Nabisco Brands. Process for extruding dough as used in producing crisp breads. 4,698,228, Cl. 426-446.000.

Straub, Otto C., to Bayer Aktiengesellschaft. Vaccines containing fat soluble vitamins, zinc compounds and selenium compounds. 4,698,221, Cl. 424-89.000.

Stritzke, Gerd O. Device for ascending and descending a kite string. 4,697,766, Cl. 244-155.00R.

Stroucken, Klaus, to Alfa-Laval Separation AB. Centrifugal separator. 4,698,053, Cl. 494-70.000.

Strubulis, Vasilios: *See*—
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Strudwick, Ian A.: *See*—
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Stupp, Edward H.; and Fellows, Mark W., to North American Philips Corporation. Variable frequency current control device for discharge lamps. 4,698,554, Cl. 315-307.000.

Sturton, Graham: *See*—
Sasse, Klaus; Hammond, Michael; Seuter, Friedel; Perzborn, Elisabeth; Pelster, Bernhard; Sturton, Graham; and Abram, Trevor, 4,698,344, Cl. 514-275.000.

Suchyta, John: *See*—
Wilkie, Brian F.; Gallup, Michael; Suchyta, John; and Raghunathan, Kuppuswamy, 4,698,750, Cl. 364-200.000.

Suda, Yasuo: *See*—
Ohtaka, Keiji; Hiramatsu, Akira; Suda, Yasuo; Akashi, Akira; and Ishizaki, Akira, 4,698,492, Cl. 250-201.000.

Sueda, Tetsuo; and Ando, Toshinori, to Canon Kabushiki Kaisha. Document sheet size or position recognition device. 4,698,511, Cl. 250-560.000.

Suganuma, Kunio, to Citizen Watch Co., Ltd. Stepping motor for a belt drive head travelling mechanism for a floppy disk drive. 4,698,710, Cl. 360-106.000.

Sugawara, Kokichi; and Matsuzaka, Takayoshi, to Sony Corporation. Flexible magnetic disc cassette. 4,698,714, Cl. 360-133.000.

Sugawara, Masayoshi; Nakamura, Yuichi; and Matsui, Akira, to Aida Engineering, Ltd. Drive device for press. 4,697,466, Cl. 74-27.000.

Sugimoto, Masahiro; Wakasugi, Yasumasa; and Harada, Shigeki, to Fujitsu Limited. Heatsink package for flip-chip IC. 4,698,663, Cl. 357-81.000.

Sugiura, Haruyuki: *See*—
Matsui, Kazuhiro; Tanigawa, Mitsuru; and Sugiura, Haruyuki, 4,697,303, Cl. 16-112.000.

Sugiura, Rikio: *See*—
Kubota, Akihiro; Aoki, Tsuyoshi; Ono, Michio; and Sugiura, Rikio, 4,698,660, Cl. 357-70.000.

Sugiyama, Genroku: *See*—
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.

Sugiyama, Isao: *See*—
Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Yamauchi, Hiroshi; Sugiyama, Isao; Machida, Yoshimasa; and Negi, Shigeto, 4,698,336, Cl. 514-202.000.

Sugiyama, Jun; Komatsubara, Hirofumi; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Device for measuring torque of a rotary mechanism. 4,697,460, Cl. 73-862.360.

Sugiyama, Jun: *See*—
Nonomura, Yutaka; Sugiyama, Jun; Komatsubara, Hirofumi; and Takeuchi, Masaharu, 4,697,459, Cl. 73-862.360.

Sugiyama, Masayoshi: *See*—
Okumura, Tsuguo; Yamagishi, Naomichi; Abe, Kazuharu; Sugiyama, Masayoshi; and Mori, Kenji, 4,698,195, Cl. 264-235.800.

Sugiyama, Yoshie: *See*—
Takaya, Takao; Takasugi, Hisashi; Kuno, Atsushi; and Sugiyama, Yoshie, 4,698,340, Cl. 514-222.000.

Sulzer Brothers Limited: *See*—
Tiefenthaler, Edelbert, 4,697,619, Cl. 137-613.000.

Suma, Sei: *See*—
Toyoda, Keiji; and Suma, Sei, 4,697,430, Cl. 62-209.000.

Sumitomo Chemical Company, Limited: *See*—
Kayane, Yutaka; Sawamoto, Hirokazu; Omura, Takashi; and Harada, Naoki, 4,698,421, Cl. 534-642.000.

Sumitomo Durez Company, Ltd.: *See*—
Saeki, Yukio; Inoue, Naomitsu; and Tokunaga, Yukio, 4,698,370, Cl. 521-128.000.

Sumitomo Metal Industries, Ltd.: *See*—
Wada, Minoru; Hidaka, Chikara; and Noma, Takeshi, 4,697,744, Cl. 241-20.000.

Sumiya, Kenji; and Takeuchi, Yoji, to Hitachi Maxell, Ltd. Magnetic recording medium. 4,698,279, Cl. 428-411.100.

Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, to Toyota Jidosha Kabushiki Kaisha; and Aisin-Warner Kabushiki Kaisha. Lock-up clutch control device for a multi-speed automatic transmission. 4,697,474, Cl. 74-733.000.

Summa, William J.: *See*—
Jones, Gerald W.; Pratt, W. Robert; and Summa, William J., 4,697,923, Cl. 356-239.000.

Summers, William E., III: *See*—
Band, Elliot I.; and Summers, William E., III, 4,698,323, Cl. 502-133.000.

Sun, Shan C.: *See*—
Chow, Kung C.; and Sun, Shan C., 4,698,718, Cl. 361-77.000.

Sundstrand Corporation: *See*—
Faber, Joseph; and Myers, Paul, 4,697,680, Cl. 192-86.000.
Linton, David J., 4,697,672, Cl. 188-134.000.
Niggemann, Richard E.; and Ellis, Wilbert E., 4,697,427, Cl. 62-119.000.

Sundstrand Data Control, Inc.: *See*—
Norling, Brian L., 4,697,455, Cl. 73-497.000.

Sunsweet Growers, Inc.: *See*—
Gunnerson, Robert E., 4,698,229, Cl. 426-512.000.

Suntory Limited: *See*—
Honda, Tadashi; and Nakanishi, Toshihiro, 4,698,423, Cl. 536-24.000.

Suomen Sokeri Oy (Finnish Sugar Company Ltd.): *See*—
Koivurinta, Juha A., 4,698,101, Cl. 127-30.000.

Suroff, Leonard W.: *See*—
Kolt, Stanley, 4,697,736, Cl. 236-49.000.

Suschitzky, John L.: *See*—
Dicker, Ian D.; and Suschitzky, John L., 4,698,345, Cl. 514-291.000.

Susumu, Matsui: *See*—
Noda, Satoko; and Susumu, Matsui, 4,698,306, Cl. 435-192.000.

Suziku, Koichi: *See*—
Ito, Masahiro; Murayama, Noboru; Suziku, Koichi; Sato, Kei; and Sato, Tsutomu, 4,698,778, Cl. 364-518.000.

Suzuki, Fujiyuki; and Osada, Akira, to Suzuki Jodosha Kogyo Kabushiki Kaisha. Method of controlling an air-fuel ratio for an internal combustion engine. 4,697,559, Cl. 123-325.000.

Suzuki, Isamu, to Kabushiki Kaisha Toshiba. Gas turbine vane. 4,697,985, Cl. 416-97.00R.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Umehara, Kazuhiro, 4,697,560, Cl. 123-335.000.

Suzuki Jodosha Kogyo Kabushiki Kaisha: *See*—
Suzuki, Fujiyuki; and Osada, Akira, 4,697,559, Cl. 123-325.000.

Suzuki, Koichi; Murayama, Noboru; Ito, Masahiro; and Sato, Kei, to Ricoh Company, Ltd. Halftone image processing method. 4,698,691, Cl. 358-283.000.

Suzuki, Masahiko: *See*—
Tsukahara, Kengi; Matsui, Kazuma; Abe, Taizoh; and Suzuki, Masahiko, 4,697,991, Cl. 417-219.000.

Suzuki, Masayuki: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,697,899, Cl. 354-173.110.

Suzuki, Mitsuo: *See*—
Tanaka, Hiroyoshi; Suzuki, Mitsuo; and Ueda, Fujio, 4,698,194, Cl. 264-185.000.
Suzuki, Osamu; Asada, Eizi; and Fukuoka, Tatsuhiko, to Taiho Kogyo Co., Ltd. Electric conductive and sliding resin material. 4,698,179, Cl. 252-511.000.
Suzuki, Shizuo: *See*—
Takeuchi, Mamoru; Nemoto, Sadao; Suzuki, Shizuo; and Kawai, Juichiro, 4,697,984, Cl. 415-142.000.
Suzuki, Takashi: *See*—
Imai, Tetsuya; Fujita, Hiroshi; Koikeda, Minoru; and Suzuki, Takashi, 4,698,449, Cl. 585-469.000.
Suzuki, Yasutoshi; Itoh, Hiroshi; Ohmi, Shinya; and Hara, Kunihiko, to Nippondenso Co., Ltd. Control apparatus for two section, glare shield mirror. 4,697,883, Cl. 350-331.00R.
Suzuki, Yoshiji: *See*—
Kinoshita, Katsuyuki; and Suzuki, Yoshiji, 4,698,544, Cl. 313-379.000.
Swanson, Gary L.: *See*—
James, Steven P.; Karr, Roger W.; and Swanson, Gary L., 4,697,572, Cl. 126-343.50R.
Swanson, Wesley S.: *See*—
Kolze, Lawrence A.; Pick, James M.; and Swanson, Wesley S., 4,697,608, Cl. 137-1.000.
Swanstrom, Carl P.: *See*—
Fochtman, Edward G.; and Swanstrom, Carl P., 4,697,457, Cl. 73-820.000.
SWF Auto-Electric GmbH: *See*—
Andrei-Alexandru, Marcel; Kofink, Wolfgang; Schmid, Eckhardt; and Tietz, Volker, 4,698,560, Cl. 318-54.000.
Swift, Allan W. Security seal. 4,697,833, Cl. 292-318.000.
Swift, William; and Fischell, Robert E., to Parker Hannifin Corporation. Passive filling device. 4,697,622, Cl. 141-1.000.
Swinton, James D.: *See*—
Peebles, John A.; and Swinton, James D., 4,697,944, Cl. 400-635.000.
SWM Corporation: *See*—
Prew, Stanley R., 4,697,750, Cl. 241-247.000.
Sylvester, William, to Safariland Ballistics, Inc. Ballistics vest. 4,697,285, Cl. 2-2.500.
Syntex (U.S.A.) Inc.: *See*—
Nestor, John J.; and Vickery, Brian H., 4,698,442, Cl. 562-560.000.
Szarka, David D., to Halliburton Company. Apparatus for setting a high temperature packer. 4,697,640, Cl. 166-120.000.
Szczepanek, Andre: *See*—
Hubbins, Stephen J.; England, David G.; Szczepanek, Andre; and Norvall, David, 4,698,753, Cl. 364-200.000.
Szpak, Anthony D.: *See*—
English, Philip H.; and Szpak, Anthony D., 4,697,502, Cl. 99-299.000.
Taarning, Claus E., to F. L. Smidth & Co. A/S. Protective triggering of thyristors in a pulse generator. 4,698,719, Cl. 361-87.000.
Tabata, Hiroshi: *See*—
Sasaki, Kiichi; Tabata, Hiroshi; Okuhara, Hisakazu; and Higuchi, Kazuo, 4,697,827, Cl. 280-808.000.
Tabata, Mitsuo: *See*—
Tojo, Toru; and Tabata, Mitsuo, 4,698,513, Cl. 250-561.000.
Tachi-S Co., Ltd.: *See*—
Osawa, Tomoaki, 4,698,253, Cl. 428-159.000.
Tachibana, Kaoru: *See*—
Kosugi, Yoshinobu; and Tachibana, Kaoru, 4,697,772, Cl. 248-183.000.
Tada, Haruo; and Nakada, Akiyoshi, to Matsushita Electric Industrial Co., Ltd. Industrial robot. 4,697,978, Cl. 414-729.000.
Taga, Yutaka: *See*—
Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, 4,697,474, Cl. 74-733.000.
Tagami, Tomoyuki, to Honda Giken Kogyo Kabushiki Kaisha. Damping force control device for vehicle damper. 4,697,824, Cl. 280-701.000.
Taguchi, Seiji: *See*—
Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, 4,697,453, Cl. 73-290.00R.
Taiho Kogyo Co., Ltd.: *See*—
Suzuki, Osamu; Asada, Eizi; and Fukuoka, Tatsuhiko, 4,698,179, Cl. 252-511.000.
Taiyo Tanko Co., Ltd.: *See*—
Doi, Sadao; Yamada, Tohru; Matsumoto, Shungo; and Yamamoto, Taizo, 4,697,644, Cl. 172-123.000.
Takabe, Ryoji: *See*—
Murakawa, Shigemi; Taguchi, Seiji; Nomura, Makoto; Takabe, Ryoji; Iwashita, Yoshiharu; and Ishii, Masahiro, 4,697,453, Cl. 73-290.00R.
Takada, Mitsuru: *See*—
Inagaki, Takafumi; Sasaoka, Hiroshi; Masutomi, Susumu; Itoh, Hiroshi; and Takada, Mitsuru, 4,698,764, Cl. 364-424.100.
Takada, Toshio: *See*—
Nagai, Norimichi; Horiishi, Nanao; Kiyama, Masao; and Takada, Toshio, 4,698,182, Cl. 252-62.590.
Takagi, Yasushi: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.
Takahashi, Hidenao: *See*—
Hatakeyama, Hideharu; and Takahashi, Hidenao, 4,697,992, Cl. 417-269.000.
Takahashi, Hiroshi: *See*—
Ono, Katsuhiro; Sakuma, Tatsuya; and Takahashi, Hiroshi, 4,698,835, Cl. 378-136.000.
Takahashi, Isoji: *See*—
Sato, Yoshimitsu; Ohtsuka, Shuichi; Kimura, Akinori; Yoda, Akira; Kato, Keishi; and Takahashi, Isoji, 4,697,912, Cl. 355-3.00R.
Takahashi, Katsuhito, to Minigrip, Inc. Apparatus for forming plastic fastener and plastic accessory strips and uniting the same with a film. 4,698,118, Cl. 156-499.000.
Takahashi, Kazuhisa; Kawasaki, Keiichi; and Itoh, Yuji, to Canon Kabushiki Kaisha. Image recording method and apparatus such as a light beam multiformat camera. 4,698,648, Cl. 346-108.000.
Takahashi, Kenji: *See*—
Nakamura, Takashi; and Takahashi, Kenji, 4,698,508, Cl. 250-484.100.
Takahashi, Kouji; and Fujiwara, Akihiro, to Canon Kabushiki Kaisha. Automatic focusing system. 4,697,904, Cl. 354-403.000.
Takahashi, Nobuyuki: *See*—
Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, 4,698,102, Cl. 148-2.000.
Takahashi, Sankichi: *See*—
Matsuzaki, Harumi; Kubota, Masayoshi; Ebara, Katsuya; Takahashi, Sankichi; and Kuroiwa, Minoru, 4,698,153, Cl. 210-192.000.
Takahashi, Susumu: *See*—
Umemoto, Yasunari; Takahashi, Susumu; and Ono, Yuichi, 4,698,652, Cl. 357-16.000.
Takahashi, Tetujiro: *See*—
Nakamura, Michiei; Takeuchi, Hitoshi; Takahashi, Tetujiro; Takizawa, Minoru; and Horiguchi, Shojiro, 4,698,099, Cl. 106-288.00R.
Takahashi, Yasuo, to Shinwa Seisakusho Co., Ltd. Method of manufacturing fiber bundles for use in brushes. 4,697,851, Cl. 300-1.000.
Takai, Fumio: *See*—
Furukawa, Toshiharu; Shimura, Susumu; Takai, Fumio; Sano, Norio; and Ishida, Tomonobu, 4,697,532, Cl. 110-346.000.
Takaishi, Naotake; and Hori, Kimihiko, to Kao Corporation. Process for preparing 3-phenacylidene phthalides. 4,698,435, Cl. 549-305.000.
Takamiya, Kikuzo; Ishibashi, Hideyuki; and Kozakae, Kunitoshi, to Bridgestone Cycle Co., Ltd. Stepless speed change device. 4,697,469, Cl. 74-117.000.
Takamura, Koji; Hosoya, Takamasa; and Kobayashi, Kazunari, to Olympus Optical Co., Ltd. Connection device for connecting an associated unit to an eyepiece section of an endoscope. 4,697,894, Cl. 350-574.000.
Takanashi, Kenji: *See*—
Kubota, Tatsuya; and Takanashi, Kenji, 4,698,676, Cl. 358-140.000.
Takano, Takeshi: *See*—
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; and Takano, Takeshi, 4,698,320, Cl. 501-96.000.
Takano, Yoshiaki; and Kinoshita, Keichi, to Minolta Camera Kabushiki Kaisha. Copying machine. 4,697,917, Cl. 355-14.00R.
Takara Shuzo Co., Ltd.: *See*—
Noda, Satoko; and Susumu, Matsui, 4,698,306, Cl. 435-192.000.
Takasugi, Hisashi: *See*—
Takaya, Takao; Takasugi, Hisashi; Tsuji, Kiyoshi; and Chiba, Toshiyuki, 4,698,337, Cl. 514-206.000.
Takaya, Takao; Takasugi, Hisashi; Kuno, Atsushi; and Sugiyama, Yoshie, 4,698,340, Cl. 514-222.000.
Takata, Yoshirou: *See*—
Goto, Teruo; Takata, Yoshirou; Muraji, Kenji; and Higashi, Mikio, 4,698,622, Cl. 340-648.000.
Takatsu, Haruyoshi: *See*—
Tanaka, Yasuyuki; Takatsu, Haruyoshi; and Takeuchi, Kiyohumi, 4,698,177, Cl. 252-299.630.
Takaya, Takao; Takasugi, Hisashi; Tsuji, Kiyoshi; and Chiba, Toshiyuki, to Fujisawa Pharmaceutical Co., Ltd. Cephem compounds and processes for preparation thereof. 4,698,337, Cl. 514-206.000.
Takaya, Takao; Takasugi, Hisashi; Kuno, Atsushi; and Sugiyama, Yoshie, to Fujisawa Pharmaceutical Co., Ltd. Pyrimidine derivatives, processes for preparation thereof and composition containing the same. 4,698,340, Cl. 514-222.000.
Takeda Chemical Industries, Ltd.: *See*—
Yoshioka, Koichi; Tamura, Norikazu; and Natsugari, Hideaki, 4,698,339, Cl. 514-210.000.
Takei, Yuji: *See*—
Ishiki, Naotsugu; and Takei, Yuji, 4,697,420, Cl. 60-517.000.
Takenoya, Hideaki; and Mishima, Fumiyuki, to Janome Sewing Machine Industry Co., Ltd. Platen and paper drive in an inked-platen wire-dot impact printer. 4,697,941, Cl. 400-185.000.
Takesa, Kazuhiko: *See*—
Tsuchimoto, Yoshihiro; and Takesa, Kazuhiko, 4,697,615, Cl. 137-340.000.
Takeshita, Keiji: *See*—
Hamano, Hideo; Takeshita, Keiji; and Funato, Yasumichi, 4,697,781, Cl. 248-559.000.
Takeuchi, Hitoshi: *See*—
Nakamura, Michiei; Takeuchi, Hitoshi; Takahashi, Tetujiro; Takizawa, Minoru; and Horiguchi, Shojiro, 4,698,099, Cl. 106-288.00R.
Takeuchi, Kiyohumi: *See*—
Tanaka, Yasuyuki; Takatsu, Haruyoshi; and Takeuchi, Kiyohumi, 4,698,177, Cl. 252-299.630.

Takeuchi, Mamoru; Nemoto, Sadao; Suzuki, Shizuo; and Kawai, Juichiro, to Hitachi, Ltd. Supporting structure for underwater structure. 4,697,984, Cl. 415-142.000.

Takeuchi, Masaharu: *See*—
Nonomura, Yutaka; Sugiyama, Jun; Komatsubara, Hirofumi; and Takeuchi, Masaharu, 4,697,459, Cl. 73-862.360.
Sugiyama, Jun; Komatsubara, Hirofumi; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,697,460, Cl. 73-862.360.

Takeuchi, Takashi: *See*—
Sugiyama, Jun; Komatsubara, Hirofumi; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,697,460, Cl. 73-862.360.

Takeuchi, Yoji: *See*—
Sumiya, Kenji; and Takeuchi, Yoji, 4,698,279, Cl. 428-411.100.

Takimura, Keisuke: *See*—
Sasaki, Kan; Takimura, Keisuke; and Katayama, Nobuaki, 4,697,470, Cl. 74-701.000.

Takizawa, Minoru: *See*—
Nakamura, Michiei; Takeuchi, Hitoshi; Takahashi, Tetujiro; Takizawa, Minoru; and Horiguchi, Shojiro, 4,698,099, Cl. 106-288.00R.

Takubo, Yoneharu; Horibe, Yasutaka; and Yamanishi, Nobue, to Matsushita Electric Industrial Co., Ltd. Light shutter array element. 4,697,889, Cl. 350-392.000.

Taleyarkhan, Rusi P., to Westinghouse Electric Corp. Intermediate flow mixing nonsupport grid for BWR fuel assembly. 4,698,204, Cl. 376-439.000.

Tallafus, Ottmar. Cooling auger. 4,697,508, Cl. 99-517.000.

Talonen, Tauno; and Niemi, Riitta, to Tamfelt Oy Ab. Method for the manufacture of a press felt and press felt. 4,698,250, Cl. 428-58.000.

Tamagawa, Tohoru: *See*—
Kaneko, Eiji; Yanabu, Satoru; and Tamagawa, Tohoru, 4,698,467, Cl. 200-144.00B.

Tamamura, Hideo, to Canon Kabushiki Kaisha. Watertight camera. 4,697,897, Cl. 354-64.000.

Tamarack Scientific Co., Inc.: *See*—
Sheets, Ronald E., 4,698,486, Cl. 250-492.200.

Tamba, Shinichi; and Ueki, Noriyuki, to Kawasaki Jukogyo Kabushiki Kaisha. V-type internal combustion engine. 4,697,557, Cl. 123-319.000.

Tamba, Shinichi: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; Tamba, Shinichi; and Fukui, Noboru, 4,697,555, Cl. 123-90.230.

Tamfelt Oy Ab: *See*—
Talonen, Tauno; and Niemi, Riitta, 4,698,250, Cl. 428-58.000.

Tamura, Kaoru: *See*—
Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, 4,697,902, Cl. 354-281.000.

Tamura, Norikazu: *See*—
Yoshioka, Koichi; Tamura, Norikazu; and Natsugari, Hideaki, 4,698,339, Cl. 514-210.000.

Tamura, Yasuyuki: *See*—
Okada, Shinjiro; and Tamura, Yasuyuki, 4,697,887, Cl. 350-350.00S.

Tanaka, Haruma; and Ohashi, Yasuo, to Honda Giken Kogyo Kabushiki Kaisha. Poly-V pulley formed of sheet metal and method and apparatus for making same. 4,697,445, Cl. 72-68.000.

Tanaka, Hideaki: *See*—
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.

Tanaka, Hiroyoshi; Suzuki, Mitsuo; and Ueda, Fujio, to Toray Industries, Inc. Process for producing ultra-high-tenacity polyvinyl alcohol fiber. 4,698,194, Cl. 264-185.000.

Tanaka, Kazuo: *See*—
Fukuda, Yasushi; Oka, Takafumi; and Tanaka, Kazuo, 4,698,810, Cl. 371-38.000.

Tanaka, Kunio: *See*—
Nakaya, Keiichi; Tanaka, Kunio; Kanno, Fukuo; and Kobayashi, Mitaka, 4,698,379, Cl. 523-513.000.

Tanaka, Masahiro: *See*—
Endo, Hiroshi; Arai, Masakazu; Nishikawa, Shigeo; Saito, Masanori; Tanaka, Masahiro; Nagasaki, Kunikazu; and Mathuno, Shigeki, 4,698,191, Cl. 264-50.000.

Tanaka, Morimasa; and Kyoden, Tatsuo, to Ichikoh industries Limited. Remote-control switch for motor-driven automotive mirror. 4,698,463, Cl. 200-5.00R.

Tanaka, Morimasa; and Ito, Shinichiro, to Ichikoh Industries Limited. Control switch for motor driven remote control mirror in vehicle. 4,698,464, Cl. 200-5.00R.

Tanaka, Yasuyuki; Takatsu, Haruyoshi; and Takeuchi, Kiyohumi, to Dainippon Ink and Chemicals, Inc. Cyclohexylcyclohexene derivatives. 4,698,177, Cl. 252-299.630.

Tandon, Jagdish C.: *See*—
Araghi, Mehdi N.; and Tandon, Jagdish C., 4,698,131, Cl. 156-647.000.

Tanemura, Mitsuru; Matsunaga, Isao; and Saitou, Masami, to Chugai Seiyaku Kabushiki Kaisha. Benzoic acid derivatives. 4,698,364, Cl. 514-563.000.

Tange, Akira: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.

Tangorra, Giorgio, to Industrie Pirelli S.p.A. Oleoelastic energy accumulator. 4,697,674, Cl. 188-298.000.

Tanigawa, Mitsuru: *See*—
Matsui, Kazuhiro; Tanigawa, Mitsuru; and Sugiura, Haruyuki, 4,697,303, Cl. 16-112.000.

Taniguchi, Takuji: *See*—
Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, 4,697,474, Cl. 74-733.000.

Tanimoto, Tetsuyuki: *See*—
Kimura, Kazuo; Tanimoto, Tetsuyuki; and Kobayashi, Hiroshi, 4,697,878, Cl. 350-162.110.

Tanioka, Hiroshi, to Canon Kabushiki Kaisha. Image signal processor. 4,698,690, Cl. 358-283.000.

Tao, Hiroaki, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Method for measurement of gas concentration. 4,698,314, Cl. 436-171.000.

Tarasenko, Vladimir I.: *See*—
Kostylev, Alexandr D.; Plavskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., 4,697,647, Cl. 173-91.000.

Tateosian, Louis; and Roemer, Frederick D., to Dentsply Research & Development Corp. Stable one part dental compositions employing ipn technology. 4,698,373, Cl. 522-95.000.

Tator, Kenneth B.; and Lackey, Richard O., to KTA-Tator, Inc. Environmental exposure tester. 4,698,507, Cl. 250-429.000.

Tatsumi, Akira: *See*—
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.

Taube, Thomas: *See*—
Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, 4,698,825, Cl. 373-93.000.

Tauschel, Horst-Dietmar: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, 4,698,341, Cl. 514-230.000.

Tavana, Danesh; and Wong, Sing Y., to Monolithic Memories, Inc. Buffered Miller current compensating circuit. 4,698,525, Cl. 307-456.000.

Taylor, Chandler R., Jr.; and Lo, Young S., to A. H. Robins Company, Inc. Nitro, amino and aroylamino-n-phenylpyridinamines. 4,698,430, Cl. 546-262.000.

Taylor, Malcolm R.: *See*—
Barr, John D.; and Taylor, Malcolm R., 4,697,654, Cl. 175-329.000.

Taylor, Robert E.: *See*—
Chenot, Charles F.; and Taylor, Robert E., 4,698,548, Cl. 313-487.000.

TBL Development Corporation: *See*—
Towns, Edward J.; and Brown, Edward M., 4,697,714, Cl. 215-252.000.

Teac Corportion: *See*—
Ando, Yasuhiko, 4,697,467, Cl. 74-89.200.

Teague, Richard M.: *See*—
Annas, Dulin L., Sr.; and Teague, Richard M., 4,697,857, Cl. 312-306.000.

Teichmer, Daniel G.: *See*—
Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,698,460, Cl. 178-19.000.

Teijin Limited: *See*—
Sasaki, Yoshiyuki; and Kasaoka, Katsuyuki, 4,698,260, Cl. 428-399.000.

Tektronix, Inc.: *See*—
Baur, Bruce K.; and Meigs, Gordon W., 4,698,559, Cl. 315-408.000.
Krein, Philip T.; Meadows, Robert D.; Murdock, Bruce; and Teichmer, Daniel G., 4,698,460, Cl. 178-19.000.
Meadows, Robert D.; Krein, Philip T.; and Murdock, Bruce, 4,698,461, Cl. 178-19.000.

Telectronics N.V.: *See*—
Breyer, Branko; and Cikes, Ivo, 4,697,595, Cl. 128-660.000.

Telefonaktiebolaget L M Ericsson: *See*—
Kron, Karl L. E., 4,698,722, Cl. 361-111.000.
Madsen, Henning S.; Sergero, Tommy S.; and Johansson, Karl A., 4,697,334, Cl. 29-594.000.
Serrander, Hans R., 4,697,872, Cl. 350-96.210.

Telefunken Electronic GmbH: *See*—
Angerstein, Jorg; Mutz, Dieter; and Wagner, Elmar, 4,697,880, Cl. 350-247.000.

Telephone and Telegraph Company, AT&T Bell Labs: *See*—
Flores, Christopher; and Gopinath, Bhaskarpillai, 4,698,804, Cl. 370-86.000.

Temes Corporation: *See*—
Dickerson, Clifford; and Keithly, David, 4,697,424, Cl. 60-670.000.

Temple, John. Humidifying hot water heater. 4,697,735, Cl. 236-44.00C.

Tenneco Oil Company: *See*—
Vogel, John V., 4,697,642, Cl. 166-263.000.

Terabayashi, Takao: *See*—
Daiko, Yoichi; Masuda, Masami; and Terabayashi, Takao, 4,697,964, Cl. 408-6.000.

Terakado, Tomoji; and Odagiri, Yuichi, to NEC Corporation. Integrated light emitting/receiving amplifier element. 4,698,821, Cl. 372-50.000.

Terauchi, Ryugo, to Nippon Rehabili-Medical Corporation. Body massage apparatus with demountable vibrator. 4,697,580, Cl. 128-36.000.

Terskov, Alexei D.: *See*—
Kostylev, Alexandr D.; Plavskikh, Vladimir D.; Skachkov, Konstantin B.; Terskov, Alexei D.; Reznikov, Igor I.; and Tarasenko, Vladimir I., 4,697,647, Cl. 173-91.000.

Terui, Nobuhiko; and Hagiuda, Nobuyoshi, to Nippon Kogaku K.K. Flash photographing system. 4,697,907, Cl. 354-416.000.

Teshima, Daisuke: *See*—
Koizumi, Satoru; Teshima, Daisuke; and Katayama, Yoshio, 4,698,704, Cl. 360-74.100.

Teshima, Hitoshi: *See*—
Shimozi, Kozi; and Teshima, Hitoshi, 4,698,213, Cl. 422-179.000.

Testi, Termano: *See*—
Merli, Gabriele; and Testi, Termano, 4,698,597, Cl. 328-163.000.

Tetra Pak International AB: *See*—
Hilmersson, Anders E.; and Ulvros, Istvan M., 4,698,514, Cl. 250-566.000.

Tetsutani, Nobuji: *See*—
Ochi, Hiroshi; Tetsutani, Nobuji; Yamamoto, Tetsuji; Kitani, Shigehisa; and Watanabe, Asao, 4,698,688, Cl. 358-257.000.

Tetzlaff, Ernst, to SIGRI GmbH. Method for the manufacture of vitreous carbon bodies. 4,698,189, Cl. 264-22.000.

Tew, Ho H.: *See*—
Kindig, Alan L.; and Tew, Ho H., 4,698,533, Cl. 310-71.000.

Texaco Inc.: *See*—
Vanderpool, Steven H., 4,698,427, Cl. 544-404.000.
Zimmerman, Robert L.; and Vanderpool, Steven H., 4,698,428, Cl. 544-404.000.

Texas Instrument Incorporated: *See*—
Maxwell, James W., 4,698,024, Cl. 439-62.000.

Texas Instruments Incorporated: *See*—
Hubbins, Stephen J.; England, David G.; Szczepanek, Andre; and Norvall, David, 4,698,753, Cl. 364-200.000.
Hwang, Yin-Chao; and Powell, Theo J., 4,698,588, Cl. 324-73.00R.
Paterson, James L.; and Haken, Boger A., 4,697,330, Cl. 437-42.000.
Rice, Joseph A., Jr.; McGregor, Douglas D.; Colegrove, Forrest D.; and Marton, Bela, 4,697,519, Cl. 102-406.000.
Schmid, Hermann, 4,697,784, Cl. 249-119.000.

Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft: *See*—
Fuchs, Helmut, 4,697,412, Cl. 57-401.000.

Th. Goldschmidt AG: *See*—
Huttinger, Rudolf; Kollmeier, Hans-Joachim; Langenhagen, Rolf-Dieter; Walter, Alfred; and Wolfes, Wilhelm, 4,698,178, Cl. 252-309.000.

Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., to GTE Laboratories Incorporated. Methods for the preparation of oriented thin large-area single crystals of diacetylenes and polydiacetylenes. 4,698,121, Cl. 156-622.000.

Thalmann, Alfred, to Georg Fischer Aktiengesellschaft. Prefabricated assembly for high tensile strength pipe connections. 4,697,831, Cl. 285-174.000.

Thanivavarn, Suwat, to TRW Inc. Integrated optical waveguide polarizer. 4,697,868, Cl. 350-96.120.

Thermo-O-Type Corporation: *See*—
Van Pelt, Christopher K., 4,698,504, Cl. 250-319.000.

Theyson, Thomas W., to Glyco Inc. Shock treatment of aqueous systems. 4,698,165, Cl. 210-755.000.

Thibault, Paul A.: *See*—
Bouchard, Andre C.; and Thibault, Paul A., 4,698,040, Cl. 445-26.000.

Thie, Werner: *See*—
Sanz, Ernst; Steger, Jean P.; and Thie, Werner, 4,697,597, Cl. 128-699.000.

Thin-Lite Corporation: *See*—
Griffin, Alan R., 4,698,733, Cl. 362-222.000.

Thiot, Andre : *See*—
Runavot, Yves; Thiot, Andre ; and Salvetat, Jacques, 4,698,405, Cl. 526-347.000.

Thomas & Betts Corporation: *See*—
Bordbar, Hosrow T., 4,698,457, Cl. 174-36.000.

Thompson, Douglas A. Hydro-electric power plant. 4,698,516, Cl. 290-54.000.

Thompson, Robert R.; Mothersole, David S.; and MacGregor, Douglas B., to Motorola, Inc. Instruction address calculation unit for a microprocessor. 4,698,747, Cl. 364-200.000.

Thompson, William: *See*—
Kellogg, Edwin M.; Dobbs, John M.; Dunn, Gregory J.; Kaufmann, Henry C.; and Thompson, William, 4,698,236, Cl. 427-43.100.

Thomson-CSF: *See*—
Bessonneau, Guy; Carnez, Bernard; Derewonko, Henry; and Lepage, Joel, 4,698,661, Cl. 357-74.000.
Boulitrop, Francois; Chartier, Eric; Mourey, Bruno; and Le Berre, Serge, 4,697,331, Cl. 437-82.000.
Forterre, Gerard; and Guerin, Bernard, 4,698,604, Cl. 333-24.200.
Gerbe, Jean-Pierre, 4,697,879, Cl. 350-174.000.
Kohn, Erhard, 4,698,654, Cl. 357-22.000.
Sassier, Pierre, 4,697,643, Cl. 169-23.000.

Thomson, David J.: *See*—
McPherson, Ross; Smolik, Kenneth F.; and Thomson, David J., 4,698,769, Cl. 364-724.000.

Thomson, Peter K., to National Semiconductor Corporation. Power switch for dual power supply circuit. 4,698,530, Cl. 307-571.000.

Thulin, Robert; Ross, Robert E.; and Polifroni, Nicholas, to Nabisco Brands, Inc. Apparatus for co-extrusion of a dough mass with particulate matter in the outer dough. 4,698,000, Cl. 425-133.100.

Thuries, Edmond: *See*—
Pham, Van Doan; and Thuries, Edmond, 4,698,469, Cl. 200-148.00E.

Thuy, Pham D.; and Vanypre, Dominique, to SFENA-Societe Francaise d'Equippements pour la Navigation Aereenne. Process for smoothing the curves generated in a television scanning system. 4,698,768, Cl. 364-521.000.

Tiefenthaler, Edelbert, to Sulzer Brothers Limited. Solenoid valve having a power amplifier. 4,697,619, Cl. 137-613.000.

Tietz, Volker: *See*—
Andrei-Alexandru, Marcel; Kofink, Wolfgang; Schmid, Eckhardt; and Tietz, Volker, 4,698,560, Cl. 318-54.000.

Tijne, Jean-Louis: *See*—
Lamalle, Jean; and Tijne, Jean-Louis, 4,698,011, Cl. 425-389.000.

Tilcock, Colin P. S.: *See*—
Janoff, Andrew S.; Rauch, Joyce; and Tilcock, Colin P. S., 4,698,299, Cl. 435-13.000.

Timmermann, Uwe: *See*—
Herkert, Hans; and Timmermann, Uwe, 4,698,628, Cl. 340-825.020.

Tischenko, Valentina A.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

Titov, Mikhail I.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

Tittmann, Bernhard R.: *See*—
Greenfeld, Albert R.; Reis, Herbert; and Tittmann, Bernhard R., 4,698,058, Cl. 604-266.000.

Titus, Robert D.: *See*—
Schaus, John M.; and Titus, Robert D., 4,698,347, Cl. 514-293.000.

Toda Kogyo Corp.: *See*—
Nagai, Norimichi; Horiishi, Nanao; Kiyama, Masao; and Takada, Toshio, 4,698,182, Cl. 252-62.590.

Todd, Donald W. Mailbox flag extension device. 4,697,733, Cl. 232-34.000.

Todd, Lee T., Jr.; and Starkey, Cornelius J., IV, to Hilliard-Lyons Patent Management, Inc. Cathodochromic CRT erasure and tube set up method. 4,698,684, Cl. 358-237.000.

Tohya, Hirokazu; and Kido, Tooru, to NEC Corporation. Power supply source control system. 4,698,517, Cl. 307-43.000.

Tojo, Toru; and Tabata, Mitsuo, to Kabushiki Kaishi Toshiba. Position detector by vibrating a light beam for averaging the reflected light. 4,698,513, Cl. 250-561.000.

Tokarsky, Edward W., to Du Pont de Nemours, E. I., and Company. High density para-aramid papers. 4,698,267, Cl. 428-474.400.

Tokico Ltd.: *See*—
Kitamura, Makoto; and Yamaguchi, Kiyoshi, 4,697,796, Cl. 267-35.000.

Tokizaki, Hisashi: *See*—
Itani, Kiyoshi; Tokizaki, Hisashi; Funagoshi, Tomohide; Ohtsuka, Nobuo; Ohkubo, Katsuhiro; and Katsuki, Hikaru, 4,698,744, Cl. 364-140.000.

Tokunaga, Yukio: *See*—
Saeki, Yukio; Inoue, Naomitsu; and Tokunaga, Yukio, 4,698,370, Cl. 521-128.000.

Tokyo Electric Co., Ltd.: *See*—
Sakura, Yasuhiro; Haraga, Koichi; Nimura, Hitoshi; and Ishikawa, Mamoru, 4,697,908, Cl. 400-120.000.
Yagi, Takashi; Horii, Yoshiharu; and Domoto, Yasuo, 4,697,942, Cl. 400-208.000.

Tokyo Pigeon Co., Ltd.: *See*—
Umino, Kunio, 4,698,705, Cl. 360-92.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Mizutani, Yoshihisa, 4,698,659, Cl. 357-42.000.

Tomforde, Johann, to Daimler-Benz. Anti-glare device for motor vehicles. 4,697,843, Cl. 296-97.00G.

Tomita, Masao; and Hashima, Akio, to Matsushita Electric Industrial Co., Ltd. Video signal processing apparatus for video tape recorders. 4,698,694, Cl. 358-326.000.

Tomono, Kunisaburo: *See*—
Imamura, Eiji; Kumokawa, Takashi; Nakayama, Fumio; Mandai, Haruhumi; Fukutani, Iwao; and Tomono, Kunisaburo, 4,698,605, Cl. 333-184.000.

Tomosada, Masahiro: *See*—
Komiya, Yutaka; Tomosada, Masahiro; Nakamura, Shinichi; Miyata, Masanori; Hirose, Masayuki; and Adachi, Hideki, 4,697,916, Cl. 355-14.00E.

Toncelli, Marcello. Process for the formation of blocks of any material by means of the contemporaneous action of vibrations, compression and vacuum intended for cutting into slabs and apparatus adapted to carry out the said process. 4,698,010, Cl. 425-200.000.

Tootle, James N.: *See*—
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,697,499, Cl. 92-151.000.

Tootsie Roll Industries, Inc.: *See*—
Schneider, Wesley C., 4,697,699, Cl. 206-44.110.

Toray Industries, Inc.: *See*—
Haraguchi, Masato, 4,698,160, Cl. 210-647.000.
Miwa, Kishio; Nagaoka, Yukiko; and Inoue, Takehisa, 4,698,453, Cl. 585-828.000.
Tanaka, Hiroyoshi; Suzuki, Mitsuo; and Ueda, Fujio, 4,698,194, Cl. 264-185.000.

Toray Thiokol Company Limited: *See—*
Nakagima, Masashi; Kojima, Hiroshi; Matsui, Tatsuro; and Dokoshi, Noriaki, 4,698,407, Cl. 528-14.000.
Torii, Nobutoshi: *See—*
Nakashima, Seiichiro; Toyoda, Kenichi; Sakakibara, Shinsuke; and Torii, Nobutoshi, 4,697,979, Cl. 414-786.000.
Tosaka, Yoichi: *See—*
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,697,899, Cl. 354-173.110.
Toshiba Silicone Company, Ltd.: *See—*
Fujimoto, Tetsuo, 4,698,386, Cl. 524-862.000.
Towns, Edward J.; and Brown, Edward M., to TBL Development Corporation. Break-away container closure. 4,697,714, Cl. 215-252.000.
Towns, Edward J.: *See—*
Chamberlin, Edward B.; Brown, Edward M.; and Towns, Edward J., 4,697,993, Cl. 417-514.000.
Toya, Tomohiro; Hara, Hajime; Iida, Shigeki; and Satoh, Tetsuo, to Nippon Oil Company, Ltd. Cholesteric liquid crystal copolyesters. 4,698,397, Cl. 525-437.000.
Toyama Chemical Co., Ltd.: *See—*
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.
Toyo Tire & Rubber Company Limited: *See—*
Mitsutake, Katsuharu, 4,697,627, Cl. 152-209.00R.
Toyoda Gosei Co., Ltd.: *See—*
Ishikawa, Masanobu; Nishikawa, Masumi; Ono, Satoshi; Hiramitsu, Tetsushi; and Hirano, Atsuo, 4,698,838, Cl. 379-58.000.
Toyoda, Keiji; and Suma, Sei, to Kabushiki Kaisha Toshiba. Air conditioner with a radiant temperature control. 4,697,430, Cl. 62-209.000.
Toyoda, Kenichi; Sakakibara, Shinsuke; Mizuno, Tooru; and Hara, Ryuichi, to Fanuc Ltd. Industrial robot circular arc control method for controlling the angle of a tool. 4,698,777, Cl. 364-513.000.
Toyoda, Kenichi: *See—*
Nakashima, Seiichiro; Toyoda, Kenichi; Sakakibara, Shinsuke; and Torii, Nobutoshi, 4,697,979, Cl. 414-786.000.
Toyoda, Kenji: *See—*
Satoh, Tsuyoshi; Mitsuishi, Tsutomu; Toyoda, Kenji; Naito, Kaoru; Ogawa, Makoto; and Sato, Hiroshi, 4,698,646, Cl. 346-76.0PH.
Toyota Jidosha Kabushiki Kaisha: *See—*
Ban, Megumu, 4,697,782, Cl. 248-63[illegible].000.
Hamano, Hideo; Takeshita, Keiji; and Funato, Yasumichi, 4,697,781, Cl. 248-559.000.
Hayakawa, Yoichi; Kawai, Masao; Yoshizawa, Kenichi; Harada, Yoshiharu; and Fukumura, Kagenori, 4,697,479, Cl. 74-867.000.
Inagaki, Takafumi; Sasaoka, Hiroshi; Masutomi, Susumu; Itoh, Hiroshi; and Takada, Mitsuru, 4,698,764, Cl. 364-424.100.
Oohori, Harumi, 4,698,536, Cl. 310-168.000.
Sasaki, Kan; Takimura, Keisuke; and Katayama, Nobuaki, 4,697,470, Cl. 74-701.000.
Sawada, Hiroshi; and Murai, Toshimi, 4,697,567, Cl. 123-489.000.
Sumiya, Koji; Sakaguchi, Yoshikazu; Taniguchi, Takuji; Taga, Yutaka; and Shindo, Yoshio, 4,697,474, Cl. 74-733.000.
Watanabe, Hiroyuki; Hamada, Eiichi; Hayashi, Motomu; and Ono, Kenji, 4,697,386, Cl. 49-374.000.
Toyota Joshida Kabushiki Kaisha: *See—*
Shimozi, Kozi; and Teshima, Hitoshi, 4,698,213, Cl. 422-179.000.
Tracy, David J.; Login, Robert B.; and Hashem, Mohamed M., to GAF Corporation. Lactam copolymers. 4,698,412, Cl. 528-323.000.
Trautwein, Wolfgang. Three-wheeled vehicle. 4,697,663, Cl. 180-210.000.
Trelby, Ib V., to F. L. Smidth & Co. A/S. Tube mill. 4,697,747, Cl. 241-54.000.
Trieselt, Wolfgang: *See—*
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Hettche, Albert; Schneider, Rolf; and Raubenheimer, Hans-Juergen, 4,698,174, Cl. 252-174.240.
Trimedia Corporation: *See—*
Eltoukhy, Atef, 4,697,974, Cl. 414-331.000.
Tripathy, Sukant K.: *See—*
Thakur, Mrinal K.; Tripathy, Sukant K.; and Sandman, Daniel J., 4,698,121, Cl. 156-622.000.
Trosky, William J.: *See—*
Mandel, Alan F.; Eichler, Kenneth M.; Trosky, William J.; and Moore, William H., 4,698,780, Cl. 364-550.000.
Trueblood, David M.: *See—*
Bachman, Thomas E.; McDavid, Larry S.; and Trueblood, David M., 4,697,450, Cl. 73-23.000.
Trumpf GmbH & Co.: *See—*
Klingel, Hans, 4,698,480, Cl. 219-121.0LG.
Trunko, David W.: *See—*
Aldrich, Robert G.; Earl, Geoffrey H.; and Trunko, David W., 4,698,289, Cl. 430-106.600.
Trutzschler GmbH & Co. KG: *See—*
Rudolph, Dieter, 4,697,309, Cl. 19-105.000.
Truvel Corporation: *See—*
Gerlach, Richard K., 4,698,647, Cl. 346-108.000.
TRW Automotive Products, Inc.: *See—*
Goetz, George W.; and Hamilton, Brian K., 4,698,107, Cl. 149-7.000.
TRW Inc.: *See—*
Thanivavarn, Suwat, 4,697,868, Cl. 350-96.120.
Tryon, James A.: *See—*
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Tsai, Chuang C.: *See—*
Barker, Robert A.; Tsai, Chuang C.; and Knights, John C., 4,698,104, Cl. 437-141.000.
Tsao, Utah; and Kettell, Joseph, to Lummus Crest, Inc. Treatment of waste from iron ore reduction. 4,698,219, Cl. 423-563.000.
Tsubota, Toshio: *See—*
Nishizawa, Shun-ichi; Tsubota, Toshio; and Chikura, Takashi, 4,698,568, Cl. 318-481.000.
Tsuchida, Tetsuo: *See—*
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,697,825, Cl. 280-703.000.
Tsuchimoto, Yoshihiro; and Takesa, Kazuhiko, to Asahi Glass Company Ltd.; and Nippon Kokan Kabushiki Kaisha. Butterfly valve for controlling high-temperature fluid. 4,697,615, Cl. 137-340.000.
Tsuji, Kiyoshi: *See—*
Takaya, Takao; Takasugi, Hisashi; Tsuji, Kiyoshi; and Chiba, Toshiyuki, 4,698,337, Cl. 514-206.000.
Tsukahara, Kengi; Matsui, Kazuma; Abe, Taizoh; and Suzuki, Masahiko, to Nippondenso Co., Ltd. Rotary pump having clutch which selects suitable power source. 4,697,991, Cl. 417-219.000.
Tsunekawa, Tokuichi: *See—*
Fujibayashi, Kazuo; Tsunekawa, Tokuichi; and Ohmura, Hiroshi, 4,697,905, Cl. 354-406.000.
Tuchman, Samuel: *See—*
Perlov, Gena; and Tuchman, Samuel, 4,697,989, Cl. 417-53.000.
Tuckey, Charles H., to Walbro Corporation. Rotary positive displacement fuel pump with purge port. 4,697,995, Cl. 418-15.000.
Tugaye, Anne: *See—*
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,698,175, Cl. 252-182.000.
Tujimura, Senkichi: *See—*
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Tuneblom, Eskil, to Dynapac Mfg. Inc. Cutter drum for pavement profiler. 4,697,850, Cl. 299-87.000.
Tunstall, John R., to Quixotic, Inc. Fishing lure system. 4,697,378, Cl. 43-42.090.
Tupper, Robert B.: *See—*
Sievers, Robert K.; Cooper, Martin H.; and Tupper, Robert B., 4,698,200, Cl. 376-233.000.
Tuseth, Robert D. Clamp for regulating flow of parenteral solutions. 4,697,785, Cl. 251-9.000.
Tustaniwskyj, Jerry I.; and Halkola, Kyle G., to Unisys Corporation. Leak tolerant liquid cooling system. 4,698,728, Cl. 361-385.000.
Tutikawa, Yosiji. Flat sliding door unit. 4,697,384, Cl. 49-130.000.
Twiflex Limited: *See—*
Stewart, John; and Brown, George M., 4,697,671, Cl. 188-72.900.
Tye, Gene: *See—*
Hickin, Charles W. R.; and Tye, Gene, 4,698,489, Cl. 235-407.000.
Tye, Richard J.; Lauterbach, George E.; and Standel, Philip R., to FMC Corporation. Aircraft anti-icing fluid containing carrageenan. 4,698,172, Cl. 252-70.000.
Tyldesley, Roger: *See—*
Berglund, Robert K.; Mautz, Karl E.; and Tyldesley, Roger, 4,698,128, Cl. 156-643.000.
Tzou, Kou-Hu, to GTE Laboratories Incorporated. Progressive image transmission. 4,698,689, Cl. 358-260.000.
Uchida, Isao: *See—*
Wakabayashi, Hiroshi; Kazami, Kazuyuki; and Uchida, Isao, 4,697,898, Cl. 354-127.130.
Uchida, Toshiya: *See—*
Abe, Nobuhide; Adachi, Minoru; Ito, Makoto; and Uchida, Toshiya, 4,698,774, Cl. 364-477.000.
Uchino, Hiroshi: *See—*
Shimamura, Takeo; Uchino, Hiroshi; and Kurosawa, Ryoichi, 4,698,581, Cl. 323-211.000.
Uchiyama, Eizo: *See—*
Yamamoto, Yoshun; Okubo, Hitoshi; Watanabe, Yutaka; Uchiyama, Eizo; and Yasunaga, Yutaka, 4,697,446, Cl. 72-178.000.
Ude, Werner; Besecke, Siegmund; Riemann, Achim; and Schroeder, Guenther, to Rohm GmbH. Method for making aromatic phosphorus compounds. 4,698,448, Cl. 568-14.000.
Ueda, Fujio: *See—*
Tanaka, Hiroyoshi; Suzuki, Mitsuo; and Ueda, Fujio, 4,698,194, Cl. 264-185.000.
Ueda, Toshiaki, to Hitachi, Ltd. Air-mix door control apparatus for an air conditioner for automobile. 4,697,734, Cl. 236-13.000.
Uehara, Yoshiyuki: *See—*
Kajita, Hiroshi; Ujino, Koji; and Uehara, Yoshiyuki, 4,697,911, Cl. 355-3.0SH.
Uehlinger, Werner: *See—*
Kimbell, John; and Uehlinger, Werner, 4,697,688, Cl. 198-339.100.
Ueki, Noriyuki: *See—*
Tamba, Shinichi; and Ueki, Noriyuki, 4,697,557, Cl. 123-319.000.
Ueno, Masakazu: *See—*
Kato, Toshiaki; Ueno, Masakazu; and Nishiura, Masaharu, 4,698,494, Cl. 250-211.00R.
Ueno, Takashi; and Abo, Toshimi, to Nissan Motor Co., Ltd. Method of and apparatus for controlling supercharge pressure for a turbocharger. 4,697,422, Cl. 60-602.000.

Ueyama, Seiji, to General Company Limited. Heat-sensitive transferring recording medium. 4,698,268, Cl. 428-484.000.
Uhler, Robert O.: *See*—
Gantzhorn, John E., Jr.; McCloud, John W., II; and Uhler, Robert O., 4,698,701, Cl. 360-16.000.
Ujino, Koji: *See*—
Kajita, Hiroshi; Ujino, Koji; and Uehara, Yoshiyuki, 4,697,911, Cl. 355-3.0SH.
Ullrich, Rainer W.: *See*—
Ryll, Jurgen H.; and Ullrich, Rainer W., 4,698,030, Cl. 439-752.000.
Ulman, Jeffrey A.: *See*—
Guilbault, Lawrence J.; and Ulman, Jeffrey A., 4,698,162, Cl. 210-710.000.
Ulvros, Istvan M.: *See*—
Hilmersson, Anders E.; and Ulvros, Istvan M., 4,698,514, Cl. 250-566.000.
Umehara, Kazuhiro, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Rotating speed control apparatus for an internal combustion engine. 4,697,560, Cl. 123-335.000.
Umemoto, Masuo: *See*—
Eto, Yoshizumi; Umemoto, Masuo; Kanada, Hidehiro; and Mita, Seiichi, 4,698,811, Cl. 371-38.000.
Umemoto, Yasunari; Takahashi, Susumu; and Ono, Yuichi, to Hitachi, Ltd. FET with Fermi level pinning between channel and heavily doped semiconductor gate. 4,698,652, Cl. 357-16.000.
Umetsu, Chiharu: *See*—
Hattori, Torao; Takagi, Yasushi; Tange, Akira; Umetsu, Chiharu; Kudo, Osamu; Kurimoto, Kiyoshi; and Kitamura, Rou, 4,698,050, Cl. 474-242.000.
Umezaki, Isao: *See*—
Nakai, Kimimoto; and Umezaki, Isao, 4,697,590, Cl. 128-396.000.
Umino, Kunio, to Kabushiki Kaisha Sankyo Seiki Seisakusho; and Tokyo Pigeon Co., Ltd. Tape double-cassette recorder. 4,698,705, Cl. 360-92.000.
Umino, Mitsugu, to Yoshida Kogyo K. K. Apparatus for attaching boxes to slide fasteners with separable box and pin of synthetic resin. 4,697,319, Cl. 29-33.200.
Unger, Frank M.: *See*—
Macher, Ingolf; and Unger, Frank M., 4,698,331, Cl. 514-25.000.
Ungerer, Heinz-Jurgen: *See*—
Fachat, Gaston; Sistermann, Klaus; and Ungerer, Heinz-Jurgen, 4,698,086, Cl. 65-16.000.
Uniden Corporation: *See*—
Baba, Yoshihiko; and Yamaguchi, Masahiko, 4,698,632, Cl. 342-17.000.
Uniek Plastics, Inc.: *See*—
Wenkman, Gregory J.; and Salzmann, Ferdinand F., 4,697,780, Cl. 248-558.000.
Union Camp Corporation: *See*—
Pavlin, Mark S., 4,698,180, Cl. 252-522.00R.
Union Oil Company of California: *See*—
Young, Donald C.; and Green, James A., II, 4,698,443, Cl. 564-38.000.
Unisys Corporation: *See*—
Miller, John A.; and Walker, James D., 4,698,738, Cl. 363-65.000.
Peterson, LuVerne R., 4,698,812, Cl. 371-38.000.
Tustaniwskyj, Jerry I.; and Halkola, Kyle G., 4,698,728, Cl. 361-385.000.
Unit Rig & Equipment Company: *See*—
Buchanan, Sabern D.; and Faulkner, Stephen L., 4,698,561, Cl. 318-87.000.
United Innovations Division of United Engineers, Inc.: *See*—
Parent, Christopher A.; and Voss, James R., 4,697,348, Cl. 33-18.100.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Gray, George W.; and Nicholas, Beatrice M., 4,698,176, Cl. 252-299.610.
Haigh, David G.; and Singh, Bhajan, 4,698,596, Cl. 328-127.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the: *See*—
Restall, James E.; and Hayman, Cecil, 4,698,130, Cl. 156-646.000.
United States of America
Air Force: *See*—
Armitage, David, 4,698,602, Cl. 332-7.510.
Burns, Daniel J.; Eldering, Charles A.; and Pronobis, Mark T., 4,698,587, Cl. 324-73.00R.
Jones, Franklin B.; Milberger, Walter E.; Bulgher, David E.; and Kerfoot, Charles S., 4,698,742, Cl. 363-124.000.
Witten, Mark A.; Hotze, Robert B.; and Stephenson, Leonard E., 4,697,767, Cl. 244-158.00R.
Army: *See*—
Sayles, David C., 4,698,106, Cl. 149-7.000.
Energy: *See*—
Eliason, Jay R.; and Eliason, Valerie L. C., 4,698,759, Cl. 364-420.000.
Gruen, Dieter M., 4,698,198, Cl. 376-146.000.
Kerns, John A.; Stone, Roger R.; and Fabyan, Joseph, 4,698,197, Cl. 376-142.000.
Moorhead, Arthur J., 4,698,271, Cl. 428-621.000.
Raymond, Kenneth N.; Scarrow, Robert C.; and White, David L., 4,698,431, Cl. 546-298.000.
Sievers, Robert K.; Cooper, Martin H.; and Tupper, Robert B., 4,698,200, Cl. 376-233.000.
National Aeronautics and Space Administration: *See*—
Babcock, Stephen G.; Dyer, Gerald E.; and Gordon, Stephen S., 4,698,484, Cl. 219-130.010.
Bryan, Charles F., Jr., 4,698,723, Cl. 361-218.000.
Caro, Edward R.; and Bonazza, Walter J., 4,698,028, Cl. 439-271.000.
Gunter, William D., Jr.; Donaldson, Ralph W.; and Anderson, Alma G., Jr., 4,697,922, Cl. 356-28.500.
Jones, Jack A., 4,697,425, Cl. 62-48.000.
Pacala, Thomas J., 4,698,518, Cl. 307-106.000.
Navy: *See*—
Hilton, Richard D.; and Coate, Godfrey T., 4,698,635, Cl. 342-64.000.
Kretschmer, Frank F., 4,698,827, Cl. 375-86.000.
U.S. Philips Corp.: *See*—
Boudewijns, Arnoldus J. J., 4,697,329, Cl. 437-2.000.
Bouwer, Adrianus G., 4,698,575, Cl. 318-640.000.
de Haan, Gerard, 4,698,665, Cl. 358-12.000.
Dolizy, Pierre, 4,698,496, Cl. 250-213.0VT.
Faber, Johannes W.; and Janssen, Peter J. M., 4,698,798, Cl. 369-219.000.
Harlos, Hartmut, 4,698,557, Cl. 315-383.000.
Kinghorn, John R.; and Bugg, Richard E. F., 4,698,677, Cl. 358-147.000.
Knapp, Alan G.; and Lamport, Daphne L., 4,698,555, Cl. 315-366.000.
Roschmann, Peter, 4,698,595, Cl. 324-313.000.
Severijns, Adrianus P.; Severin, Petrus J. W.; and Van Bommel, Cornelus H. M., 4,698,084, Cl. 65-3.110.
Van Roosmalen, Alfred J.; and Van Arendonk, Anton P. M., 4,698,126, Cl. 156-643.000.
Verheul, Hans H.; and Matena, Jan, 4,698,814, Cl. 371-49.000.
U.S. Precision Lens, Inc.: *See*—
Betensky, Ellis I., 4,697,892, Cl. 350-432.000.
U.S. Product Development Company: *See*—
Adell, Robert, 4,697,327, Cl. 29-527.400.
United Technologies Corporation: *See*—
Brown, Wayne M.; Neal, William F.; and Schwarz, Frederick M., 4,697,981, Cl. 415-104.000.
University of California, The Regents of the: *See*—
Crooks, Lawrence E., 4,698,593, Cl. 324-309.000.
Feinberg, David A., 4,698,592, Cl. 324-309.000.
University of Medicine & Dentistry of New Jersey: *See*—
Spillert, Charles R.; Devereux, Corinne; and Lazaro, Eric J., 4,698,335, Cl. 514-158.000.
University of Miami: *See*—
Ryan, James W.; and Chung, Alfred, 4,698,355, Cl. 514-362.000.
Ryan, James W.; and Chung, Alfred, 4,698,356, Cl. 514-362.000.
University of Minnesota, Regents of the: *See*—
Sauk, John J.; and Van Kampen, Craig L., 4,698,326, Cl. 514-7.000.
Uniweld Inc.: *See*—
Hooper, Anthony W., 4,697,982, Cl. 415-121.00G.
UOP Inc.: *See*—
Gruia, Adrian J., 4,698,146, Cl. 208-86.000.
Unjohn Company, The: *See*—
White, David R.; and Maring, Clarence J., 4,698,436, Cl. 549-361.000.
Urayama, Kiyoshi, to Sony Corporation. Magnetic tape cassette with tape protective sliding closure and lock mechanism for sliding closure. 4,697,702, Cl. 206-387.000.
Urnovitz, Howard B., to Xoma Corporation. Antibody hybrid molecules and process for their preparation. 4,698,420, Cl. 530-387.000.
Ushida, Minoru: *See*—
Aramaki, Jun; Karashima, Toshiharu; Magara, Takuji; and Ushida, Minoru, 4,698,477, Cl. 219-69.00R.
USM Corporation: *See*—
Simpson, William W.; and Fulton, Irvin G., 4,697,403, Cl. 53-551.000.
USV Pharmaceutical Corporation: *See*—
Musser, John H.; and Brown, Richard E., 4,698,346, Cl. 514-293.000.
Utilitech, Incorporated: *See*—
Kinnan, Frank R., 4,697,649, Cl. 175-19.000.
Kinnan, Frank R., 4,697,959, Cl. 405-232.000.
Valeo: *See*—
Alas, Jacques; and Graton, Michel, 4,697,682, Cl. 192-106.200.
Billet, Rene ; Mousston, Roland; and Bionaz, Jean, 4,697,417, Cl. 60-338.000.
Billet, Rene ; Rumignani, Paolo; and Chasseguet, Gustave, 4,698,045, Cl. 464-68.000.
Gay, Christian; and Lassiaz, Philippe, 4,697,681, Cl. 192-98.000.
Graton, Michel; and Carmillet, Roger F., 4,697,683, Cl. 192-107.00C.
Naudin, Jacky, 4,697,679, Cl. 192-70.180.
Valiulis, Stanley C., to Southern Imperial, Inc. Bracket for a grid-type rack. 4,697,712, Cl. 211-187.000.
Valoti, Ermanno: *See*—
Verga, Alberto; Piccolo, Oreste; and Valoti, Ermanno, 4,698,432, Cl. 548-224.000.
Valyocsik, Ernest W., to Mobil Oil Corporation. Crystalline silicate ZSM-58 and process for its preparation using a methyltropinium cation. 4,698,217, Cl. 423-328.00C.
Van Amsterdam, Peter H.: *See*—
Ruijten, Henri M.; De Bree, Hans; and Van Amsterdam, Peter H., 4,697,428, Cl. 62-124.000.

Van Arendonk, Anton P. M.: *See*—
Van Roosmalen, Alfred J.; and Van Arendonk, Anton P. M., 4,698,126, Cl. 156-643.000.

Van Bommel, Cornelus H. M.: *See*—
Severijns, Adrianus P.; Severin, Petrus J. W.; and Van Bommel, Cornelus H. M., 4,698,084, Cl. 65-3.110.

Vandame, Bertrand, to Precision Mecanique Labinal. Moisture-proof electrical connector. 4,698,027, Cl. 439-271.000.

Vanderpool, Steven H., to Texaco Inc. Catalytic method for the conjoint manufacture of N-aminoethylpiperazine and tetraethylenepentamine. 4,698,427, Cl. 544-404.000.

Vanderpool, Steven H.: *See*—
Zimmerman, Robert L.; and Vanderpool, Steven H., 4,698,428, Cl. 544-404.000.

Vanderveer, Fred: *See*—
Straka, Robert; Ross, Edgar; and Vanderveer, Fred, 4,698,228, Cl. 426-446.000.

Van Erden, Donald L.: *See*—
Ausnit, Steven; and Van Erden, Donald L., 4,698,274, Cl. 428-36.000.

VanHaeren, Gerard: *See*—
Nuttens, Hugo J. C.; and VanHaeren, Gerard, 4,698,450, Cl. 585-520.000.

Van Kampen, Craig L.: *See*—
Sauk, John J.; and Van Kampen, Craig L., 4,698,326, Cl. 514-7.000.

Van Meirvenne, Marc R.: *See*—
De Boodt, Marcel F. L. P.; De Strooper, Eric B. A.; and Van Meirvenne, Marc R., 4,697,961, Cl. 405-264.000.

Van Opstal, Martin: *See*—
Dijkstra, Albert J.; and Van Opstal, Martin, 4,698,185, Cl. 260-403.000.

Van Pelt, Christopher K., to Thermo-O-Type Corporation. Inserts attachable to a wire mesh belt for supporting sheets in a thermography apparatus. 4,698,504, Cl. 250-319.000.

Van Roosmalen, Alfred J.; and Van Arendonk, Anton P. M., to U.S. Philips Corporation. Method of manufacturing a semiconductor device by plasma etching of a double layer. 4,698,126, Cl. 156-643.000.

Van Steenburg, Kip, to Amatech Corporation. Armboard mounting assembly. 4,698,837, Cl. 378-208.000.

Van Vliet, Art. Garment-drying netting platform. 4,697,357, Cl. 34-148.000.

Vanypre, Dominique: *See*—
Thuy, Pham D.; and Vanypre, Dominique, 4,698,768, Cl. 364-521.000.

Varian Associates, Inc.: *See*—
Wells, William D.; Robinson, David M.; DeLuca, Richard M.; and Burwen, Eric D., 4,698,509, Cl. 250-492.200.

Varo, Inc.: *See*—
Kastendieck, William A.; Hart, Richard T.; and Isbell, Wayne, 4,697,783, Cl. 248-900.000.

Vassiliou, Eustathios, to Du Pont de Nemours, E. I., and Company. Preparation of fluoropolymer coated material. 4,698,110, Cl. 156-231.000.

Vassiliou, Eustathios: *See*—
McClure, George R.; and Vassiliou, Eustathios, 4,698,382, Cl. 524-292.000.

Vaughn, Wade C.: *See*—
Graham, William M.; Vaughn, Wade C.; and Inman, Charles M., 4,697,697, Cl. 206-5.100.

Vazir-Zadeh, Yousef, to Advanced Micro Devices, Inc. CMOS incrementer cell suitable for high speed operations. 4,698,831, Cl. 377-117.000.

VDO Adolf Schindling AG: *See*—
Lange, Jurgen, 4,697,738, Cl. 239-102.200.

VEB Jenaer Glaswerk: *See*—
Vogel, Jurgen; Holand, Wolfram; and Vogel, Werner, 4,698,318, Cl. 501-10.000.

VEB Kombinat Textima: *See*—
Muller, Hartwig; Hellwig, Claus; and Beyer, Dietmar, 4,697,438, Cl. 66-75.200.

Vega, Jean F.; and Morand, Philippe C., to Etat Francais. Castable smoke-generating compounds effective against infrared. 4,698,108, Cl. 149-21.000.

Vella, Paul J.: *See*—
So, Vincent C.; Hughes, Richard P.; and Vella, Paul J., 4,697,869, Cl. 350-96.150.

Verga, Alberto; Piccolo, Oreste; and Valoti, Ermanno, to Ravizza SpA. Process for the resolution of (±) 2-[2'-(p-fluorophenyl)-5'-benzoxazolyl]-propionic acid. 4,698,432, Cl. 548-224.000.

Verheul, Hans H.; and Matena, Jan, to U.S. Philips Corporation. Arrangement for checking the parity of parity-bits containing bit groups. 4,698,814, Cl. 371-49.000.

Verhoeven, Laurentius M., to Du Pont de Nemours, E. I., and Company. Method for the processing of a cable end and cable connector for connection to the cable. 4,697,339, Cl. 29-828.000.

Vermilye, Michael L., to Boeing Company, The. Hinge system for thrust reverser cowl. 4,697,763, Cl. 244-129.400.

Vermilyea, Mark E., to General Electric Company. Passive shimming assembly for MR magnet. 4,698,611, Cl. 335-298.000.

Veronesi, Luciano, to Westinghouse Electric Corp. Locking ring. 4,697,968, Cl. 411-113.000.

Vest, Glenn E.: *See*—
Cooper, Charles E.; and Vest, Glenn E., 4,698,761, Cl. 364-424.000.

Vickery, Brian H.: *See*—
Nestor, John J.; and Vickery, Brian H., 4,698,442, Cl. 562-560.000.

Victor Company of Japan, Limited: *See*—
Fukuda, Yasutaka; Shimizu, Shigeo; and Nakano, Atsushi, 4,698,251, Cl. 428-64.000.
Ishigaki, Yukinobu; Namiki, Yasuomi; Fujiwara, Hisashige; and Hirohashi, Kazutoshi, 4,698,693, Cl. 358-310.000.
Matsuo, Yasutoshi, 4,698,696, Cl. 358-340.000.

Vigliani, Umberto, to Officina Meccanica della Stanga O.M.S. S.p.A. Articulation system for articulated depressed-floor tramway carriages. 4,697,526, Cl. 105-3.000.

Vignotto, Angelo: *See*—
Bermond, Gabriele; and Vignotto, Angelo, 4,697,936, Cl. 384-484.000.

Vileda GmbH, Firma: *See*—
Perez, Antonio C., 4,697,949, Cl. 403-361.000.

Villemot, Jean-Pierre: *See*—
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,697,574, Cl. 128-1.00D.

Vinal, Albert W., to International Business Machines Corporation. Simplified, shielded twin-track read/write head structure. 4,698,711, Cl. 360-113.000.

Vinarub, Edmond I.: *See*—
Krohn, David A.; Maack, David R.; Vinarub, Edmond I.; and Ellison, John R., Jr., 4,698,616, Cl. 340-347.00P.

Vinogradov, Valentin A.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

Virgilio, Gustav: *See*—
Becker, Rudiger; Clement, Albrecht; Virgilio, Gustav; and Weller, Hugo, 4,697,563, Cl. 123-421.000.

Virgo, Richard A.: *See*—
Johnson, Harold R., III; Phillips, Allyn E.; Carrigan, Erwin R.; Virgo, Richard A.; and Mickelson, James E., 4,697,675, Cl. 192-7.000.

Vismara, Mario, to Devi S.p.A. Machine for the production of moulded articles of plastic material, in particular of crash helmets for motorcyclists and the like. 4,698,001, Cl. 425-4.00R.

Vissing, E. D. Fishhook threader. 4,697,370, Cl. 43-1.000.

Vogel, John V., to Tenneco Oil Company. Gravity stabilized thermal miscible displacement process. 4,697,642, Cl. 166-263.000.

Vogel, Jurgen; Holand, Wolfram; and Vogel, Werner, to VEB Jenaer Glaswerk. Phosphate glass ceramic for biological and medical applications. 4,698,318, Cl. 501-10.000.

Vogel, Werner: *See*—
Vogel, Jurgen; Holand, Wolfram; and Vogel, Werner, 4,698,318, Cl. 501-10.000.

Volkswagen Aktiengesellschaft: *See*—
Diessner, Eberhard; and Zahn, Ulrich, 4,697,621, Cl. 141-1.000.
Leineweber, Gunter; and Warnecke, Rolf, 4,697,497, Cl. 91-372.000.

Von Holst, Johan P.: *See*—
Oskarsson, Rolf G.; and Von Holst, Johan P., 4,698,205, Cl. 419-5.000.

Voss, James R.: *See*—
Parent, Christopher A.; and Voss, James R., 4,697,348, Cl. 33-18.100.

Vreeke, Simon P.: *See*—
Groschupp, Karl-Heinz; and Vreeke, Simon P., 4,697,522, Cl. 102-402.000.

Vsesojuzny Kardiologichesky Nauchny Tsentr Akademii Meditsinskikh Nauk SSSR: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Polonsky, Vladimir M.; Tischenko, Valentina A.; Titov, Mikhail I.; Bespalova, Zhanna D.; and Pekelis, Boris L., 4,698,419, Cl. 530-329.000.

VSP, Inc.: *See*—
Bloom, Leslie E., 4,698,674, Cl. 358-140.000.

Vulcano, Vincent. Book counter. 4,697,486, Cl. 83-79.000.

Vydyanath, Honnavalli R.: *See*—
Abbott, Richard C.; and Vydyanath, Honnavalli R., 4,697,543, Cl. 118-412.000.

W. R. Grace & Co., Cryovac Div.: *See*—
Havens, Marvin R., 4,698,111, Cl. 156-244.110.

W. Schlafhorst & Co.: *See*—
Kupper, Wilhelm; and Hensen, Helmuth, 4,697,692, Cl. 198-464.300.
Raasch, Hans, 4,697,310, Cl. 19-159.00A.

Wachholz, Winfried; and Weicht, Ulrich, to Hochtemperatur-Reaktorbau GmbH. Process for installation for the controlled discharge of activity from a reactor containment structure of a gas-cooled nuclear power plant. 4,698,202, Cl. 376-300.000.

Wada, Masaru; and Kato, Yoji, to Sony Corporation. Method of diffusion of impurities. 4,698,122, Cl. 156-625.000.

Wada, Minoru; Hidaka, Chikara; and Noma, Takeshi, to Sumitomo Metal Industries, Ltd. Process for the production of iron oxide fine powder. 4,697,744, Cl. 241-20.000.

Wagner, Bernd: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Mannhardt, Karl; Kleinschroth, Jurgen; Herrmann, Manfred; Fritschi, Edgar; Tauschel, Horst-Dietmar; Wagner, Bernd; and Wolf, Gunter, 4,698,341, Cl. 514-230.000.

Wagner, Daniel B.; and Baffi, Robert A., to Becton Dickinson and Company. Sac having a marker linked thereto. 4,698,263, Cl. 428-402.200.

Wagner, Elmar: *See—*
Angerstein, Jorg; Mutz, Dieter; and Wagner, Elmar, 4,697,880, Cl. 350-247.000.

Wainerdi, Thomas J., to Dow Chemical Company, The. Apparatus for balancing electrolytic cell gas with circulating electrolyte. 4,698,144, Cl. 204-257.000.

Waiser, Shimon. Cross bows. 4,697,571, Cl. 124-25.000.

Wakabayashi, Hiroshi; Kazami, Kazuyuki; and Uchida, Isao, to Nippon Kogaku K. K. Display device of a camera system. 4,697,898, Cl. 354-127.130.

Wakabayashi, Hiroshi; and Wakamiya, Koichi, to Nippon Kogaku K. K. Parallax correcting device in the finder of a camera. 4,697,901, Cl. 354-221.000.

Wakamiya, Koichi: *See—*
Wakabayashi, Hiroshi; and Wakamiya, Koichi, 4,697,901, Cl. 354-221.000.

Wakasugi, Yasumasa: *See—*
Sugimoto, Masahiro; Wakasugi, Yasumasa; and Harada, Shigeki, 4,698,663, Cl. 357-81.000.

Walbro Corporation: *See—*
Tuckey, Charles H., 4,697,995, Cl. 418-15.000.

Walk, Howard J., to Reed Mining Tools, Inc. Reversible roller stabilizer extensions for earth boring head. 4,697,652, Cl. 175-325.000.

Walker, James D.: *See—*
Miller, John A.; and Walker, James D., 4,698,738, Cl. 363-65.000.

Wallgren, Linus E., to Pace Incorporated. Tip for removing components from a substrate. 4,697,729, Cl. 228-20.000.

Wallow, Peter: *See—*
Bocker, Jurgen; Luther, Hans W.; Wallow, Peter; and Fritsch, Horst, 4,697,525, Cl. 102-518.000.

Walter, Alfred: *See—*
Huttinger, Rudolf; Kollmeier, Hans-Joachim; Langenhagen, Rolf-Dieter; Walter, Alfred; and Wolfes, Wilhelm, 4,698,178, Cl. 252-309.000.

Walter Just Gesellschaft m.b.H: *See—*
Faber, Ernst, 4,697,513, Cl. 101-111.000.

Walters, Paul W.; Raiche, H. Anthony; Harness, Ronald L.; and Quodala, Genaro M., to Ashland Oil, Inc. Process and apparatus for cooling during regeneration of fluid cracking catalyst. 4,698,212, Cl. 422-144.000.

Wang, John S.: *See—*
McCaskill, Rex A.; and Wang, John S., 4,698,625, Cl. 340-709.000.

Warburg, Tessa E. Yarn gauge. 4,697,346, Cl. 33-1.0BB.

Warlop, Stephen M. Antistatic vacuum cleaner and method. 4,697,300, Cl. 15-327.00R.

Warnecke, Rolf: *See—*
Leineweber, Gunter; and Warnecke, Rolf, 4,697,497, Cl. 91-372.000.

Warner Lambert Company: *See—*
Ferraro, Frank A., 4,697,342, Cl. 30-41.000.
Sheu, Shan-Shan; Yang, Robert K.; and Corsello, Vincent, 4,698,232, Cl. 426-572.000.

Warren, George H., to Puroflow Corp. Power line filter for transient and continuous noise suppression. 4,698,721, Cl. 361-110.000.

Wasserman, Albert, to Kangaroos U.S.A., Inc. Removable indicia for footwear, particularly and athletic shoe. 4,697,362, Cl. 36-136.000.

Wasserman, Allan, to Minnesota Mining and Manufacturing Company. Retroreflective fiber and method of making same. 4,697,407, Cl. 57-238.000.

Watanabe, Asao: *See—*
Ochi, Hiroshi; Tetsutani, Nobuji; Yamamoto, Tetsuji; Kitani, Shigehisa; and Watanabe, Asao, 4,698,688, Cl. 358-257.000.

Watanabe, Eifu; and Yamazaki, Toshiyuki, to Sanshin Kogyo Kabushiki Kaisha. Protective cowling arrangement for outboard motor. 4,698,037, Cl. 440-78.000.

Watanabe, Hiroyuki; Hamada, Eiichi; Hayashi, Motomu; and Ono, Kenji, to Toyota Jidosha Kabushiki Kaisha. Construction of door in motor vehicle. 4,697,386, Cl. 49-374.000.

Watanabe, Kazuya: *See—*
Maehara, Yasunori; Fujiwara, Sigemi; Koyama, Katsuhide; Tamura, Kaoru; Kawai, Yasuhiro; and Watanabe, Kazuya, 4,697,902, Cl. 354-281.000.

Watanabe, Masanori; and Hijikigawa, Masaya, to Sharp Kabushiki Kaisha. FET type sensor and a method for driving the same. 4,698,657, Cl. 357-25.000.

Watanabe, Yasuo: *See—*
Narita, Hirokazu; Konishi, Yoshinori; Nitta, Jun; Misumi, Shunjiro; Nagaki, Hideyoshi; Kitayama, Isao; Nagai, Yoriko; Watanabe, Yasuo; Matsubara, Nobuyuki; Minami, Shinzaburo; and Saikawa, Isamu, 4,698,352, Cl. 514-339.000.

Watanabe, Yoshitaka; Mamiya, Toshiharu; Ishikawa, Tadashi; and Endo, Takashi, to Canon Kabushiki Kaisha. Recording apparatus and cassette for recording medium. 4,698,650, Cl. 346-134.000.

Watanabe, Yutaka: *See—*
Yamamoto, Yoshun; Okubo, Hitoshi; Watanabe, Yutaka; Uchiyama, Eizo; and Yasunaga, Yutaka, 4,697,446, Cl. 72-178.000.

Watanate, Sizuhisa: *See—*
Ito, Hiroshi; Kugo, Masaru; and Watanate, Sizuhisa, 4,697,886, Cl. 350-336.000.

Waters, Peter J.: *See—*
Evans, Neil A.; Milligan, Brian; and Waters, Peter J., 4,698,064, Cl. 8-128.00R.

Watson, Benjamin H. Apparatus for walking on water or land. 4,698,039, Cl. 441-77.000.

Watson, David N.: *See—*
Moosbrugger, Dennis S.; DiFazio, Joseph; and Watson, David N., 4,697,365, Cl. 40-546.000.

Waynesboro Textiles: *See—*
Beruvides, Mario, 4,697,715, Cl. 215-330.000.

Wazaki, Yoshio: *See—*
Otobe, Yutaka; Niikura, Masakatsu; and Wazaki, Yoshio, 4,697,421, Cl. 60-602.000.

Weatherup, Clifford R.: *See—*
Maitland, Arthur; Menown, Hugh; Strudwick, Ian A.; Weatherup, Clifford R.; and Carman, Robert J., 4,698,546, Cl. 313-446.000.

Weaver, Max A.: *See—*
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Webb, Nathaniel: *See—*
Juzswik, David L.; Webb, Nathaniel; and Floyd, William M., 4,698,748, Cl. 364-200.000.

Wedtech Corp.: *See—*
Ionescu, Dragos; and Soiman, Mihai, 4,697,570, Cl. 123-602.000.

Wegener, Gerhard: *See—*
Engbert, Theodor; Knofel, Hartmut; and Wegener, Gerhard, 4,698,424, Cl. 544-222.000.

Wehrli, Werner; and Franz, Peter, to Buss AG. Procedure for the continuous production of free flowing and homogenous mixtures of plastic materials with admixtures. 4,698,378, Cl. 523-318.000.

Weicht, Ulrich: *See—*
Wachholz, Winfried; and Weicht, Ulrich, 4,698,202, Cl. 376-300.000.

Weik, George, to Lingl Corporation. Plate punching device with separate chamfering tool mounted to internal pressure plate. 4,698,227, Cl. 425-296.000.

Weiss, Jacqueline B.; and Hill, Christopher R. Angiogenic factor production. 4,698,301, Cl. 435-41.000.

Weiss, Karl: *See—*
Brendl, Rudolf; Hahn, Alfred; and Weiss, Karl, 4,697,802, Cl. 269-323.000.

Weiss, Leonard: *See—*
Roberts, Patrick S.; and Weiss, Leonard, 4,697,930, Cl. 368-82.000.

Weissman, Bernard. Protective device for dental models. 4,697,700, Cl. 206-83.000.

Welch Allyn, Inc.: *See—*
Krauter, Allan I., 4,697,576, Cl. 128-4.000.

Welch, Richard E.; and Newman, Robert L., to Emerson Electric Co. PTC thermal protector. 4,698,614, Cl. 338-22.00R.

Weller, Hugo: *See—*
Becker, Rudiger; Clement, Albrecht; Virgilio, Gustav; and Weller, Hugo, 4,697,563, Cl. 123-421.000.

Wells, Robert C.: *See—*
Kuramoto, Yukimasa; Oonishi, Hajimu; Sakai, Yukio; Hayashi, Yoshiki; and Wells, Robert C., 4,697,913, Cl. 355-3.00R.

Wells, William D.; Robinson, David M.; DeLuca, Richard M.; and Burwen, Eric D., to Varian Associates, Inc. High speed pattern generator for electron beam lithography. 4,698,509, Cl. 250-492.200.

Welschof, Hans-Heinrich; and Schoneberger, Joachim, to Lohr & Bromkamp GmbH. Rotary constant velocity universal joint having tracks of uniform curvature. 4,698,047, Cl. 464-145.000.

Wenkman, Gregory J.; and Salzmann, Ferdinand F., to Uniek Plastics, Inc. Beverage container holder. 4,697,780, Cl. 248-558.000.

Wensel, Neil D.; Norris, Gary E.; and Beierwaltes, Craig G., to Electro Sprayer Systems, Inc. Apparatus and method for controlling infrared dryer for discreet articles. 4,698,767, Cl. 364-471.000.

Werner, Frank; Marx, Matthias; and Schmidt, Hans U., to BASF Aktiengesellschaft. Process for the preparation of optionally cellular polyurethane-polyurea molded parts using urethane group- and isocyanurate group-containing 2,4- and/or 2,6-toluene diisocyanates. 4,698,371, Cl. 521-131.000.

Wessel, Otto: *See—*
Bungeroth, Herbert; and Wessel, Otto, 4,697,631, Cl. 164-46.000.

Wessels, Gerd; and Rohwedder, Arnim, to Siemens Aktiengesellschaft. Apparatus for acoustic irradiation of pathological changes in a patient. 4,697,579, Cl. 128-24.00A.

West Electric Company, Ltd.: *See—*
Kobayashi, Takashi; and Maruyama, Yuji, 4,697,906, Cl. 354-416.000.

West, Henrik, to F. L. Smidth & Co. A/S. Gate for splitting a flow of granular material. 4,697,686, Cl. 193-23.000.

West, John P. Hydraulically damped mounting device. 4,697,795, Cl. 267-186.000.

West Tsusho Co., Ltd.: *See—*
Hirata, Kiichi, 4,697,536, Cl. 114-222.000.

Westinghouse Electric Corp.: *See—*
Bernard, Thomas E.; Roth, Emile M; Mohan, Edwin R.; Sherwin, Gary W.; and Zomp, John M., 4,697,598, Cl. 128-731.000.
Chow, Kung C.; and Sun, Shan C., 4,698,718, Cl. 361-77.000.
Gonzalez, Avelino J.; Murphy, Franklin J.; Emery, Franklin T.; Weyant, Perry A.; and Craig, William G., 4,698,756, Cl. 364-557.000.
Higginbotham, William C., 4,698.120, Cl. 156-608.000.
Jabs, Robert H., 4,697,461, Cl. 73-862.530.
Mandel, Alan F.; Eichler, Kenneth M.; Trosky, William J.; and Moore, William H., 4,698,780, Cl. 364-550.000.
Matty, Thomas C., 4,698,670, Cl. 358-86.000.
McKee, Bobby D., 4,698,540, Cl. 310-239.000.
Milianowicz, Stanislaw A., 4,698,470, Cl. 200-288.000.
Miller, Robert C.; and Asars, Juris A., 4,698,497, Cl. 250-231.00R.

Mrenna, Stephen A.; and Whipple, Michael J., 4,698,606, Cl. 335-45.000.
Paice, Derek A., 4,698,739, Cl. 363-71.000.
Rodgers, Eugene L.; and Stacey, Eric J., 4,698,740, Cl. 363-89.000.
Ross, David P., 4,698,532, Cl. 310-12.000.
Stone, Henry W., 4,698,572, Cl. 318-568.000.
Taleyarkhan, Rusi P., 4,698,204, Cl. 376-439.000.
Veronesi, Luciano, 4,697,968, Cl. 411-113.000.

Wetzel, Jennifer A.: *See*—
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Weyant, Perry A.: *See*—
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Wheat, William R.: *See*—
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Wheatley, Maurice S., Jr.: *See*—
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Whillock, Allan A.: *See*—
Gibbons, Charles E.; Whillock, Allan A.; Lanham, Robert L.; and Kinsey, Joe L., Jr., 4,698,246, Cl. 428-35.000.

Whipple, Michael J.: *See*—
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Whirlpool Corporation: *See*—
Knoop, Donald E., 4,697,293, Cl. 8-158.000.

White, Bill W., to Halliburton Company. Sinker bar assembly. 4,697,641, Cl. 166-243.000.

White, David L.: *See*—
Raymond, Kenneth N.; Scarrow, Robert C.; and White, David L., 4,698,431, Cl. 546-298.000.

White, David R.; and Maring, Clarence J., to Upjohn Company, The. Processes for the preparation of spectinomycin analogs, novel products and intermediates therein. 4,698,436, Cl. 549-361.000.

White, Hollis N., Jr. Rotary gerotor hydraulic device with fluid control passageways through the rotor. 4,697,997, Cl. 418-61.00B.

Whitehead, Roy A.: *See*—
Chapman, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,698,302, Cl. 435-94.000.

Whiteman, Aharon E.: *See*—
Shoher, Itzhak; and Whiteman, Aharon E., 4,698,021, Cl. 433-222.100.

Whitley, Andrew. Harvester for vine type crops. 4,697,406, Cl. 56-327.00R.

Whitver, Loren K.: *See*—
Johnson, Robert D.; Havener, John W.; Reyner, Mark F.; Reyner, Franklin W., Jr.; Whitver, Loren K.; and Kilburn, Norman W., 4,697,721, Cl. 221-211.000.

Wicker, James H., to Specialty Manufacturing Company. Crossing control arm for vehicles. 4,697,541, Cl. 116-28.00R.

Wickham, John L.; Fox, Jeffrey D.; and Miller, Ross C., to J. L. Wickham Company, Incorporated, The. Adaptable machining system. 4,697,318, Cl. 29-33.00P.

Wickham, John L.; and Fox, Jeffrey D., to J. L. Wickham Company, Inc., The. Support for precisely holding a workpiece. 4,697,799, Cl. 269-32.000.

Widhopf, Martin, to Steinecker Maschinefabrik GmbH, Firma. Method and apparatus for macerating and wet-crushing brewing ingredients. 4,697,748, Cl. 241-62.000.

Wienck, Dennis A., to Halliburton Company. Pressure compensated flow rate controllers. 4,697,613, Cl. 137-171.000.

Wigoda, Luis. Beach trash machine. 4,698,150, Cl. 209-421.000.

Wikholm, Bert S.; Carlsson, Torsten L. T.; and Oster, Ake R., to Alfa-Laval AB. Apparatus for fermentation of organic material. 4,698,310, Cl. 435-316.000.

Wilber, William E. Canvas adapter alarm. 4,698,615, Cl. 340-63.000.

Wild Heerbrugg AG: *See*—
Fehr, Erwin; and Schaefer, Andreas, 4,697,893, Cl. 350-516.000.

Wileman, Ben C., III, to Wileman Industries, Inc. Marine safety system. 4,697,535, Cl. 114-183.00R.

Wileman Industries, Inc: *See*—
Wileman, Ben C., III, 4,697,535, Cl. 114-183.00R.

Wilkie, Brian F.; Gallup, Michael; Suchyta, John; and Raghunathan, Kuppuswamy, to Motorola, Inc. Security for integrated circuit microcomputer with EEPROM. 4,698,750, Cl. 364-200.000.

Wilkinson, William K.: *See*—
Lynch, Charles E.; and Wilkinson, William K., 4,698,413, Cl. 525-328.500.

Will, Malcolm. Joint prosthesis package. 4,697,703, Cl. 206-438.000.

Willard, Miles J. Potato flavor enhancing composition and method of use. 4,698,230, Cl. 426-533.000.

Wille, Mark E. Boat gunwale attachment apparatus. 4,697,775, Cl. 248-231.400.

William, Peze . Appliance for correcting rachidial deformities. 4,697,582, Cl. 128-69.000.

Williams, Edgar L. Ammunition storage compartment. 4,697,368, Cl. 42-71.020.

Williams, Joel: *See*—
Schwartz, Abraham; Williams, Joel; and Stevens, Robert D., 4,698,262, Cl. 428-402.000.

Williams, Michael O. Appliance for fixing fractures of the femur. 4,697,585, Cl. 128-92.0YZ.

Williams, Robert R.: *See*—
Lembach, Robert F.; Lewis, Steven D.; and Williams, Robert R., 4,698,760, Cl. 364-490.000.

Willner, Harry; and Kjolseth, Ove. Method for controlling an electrothermal process. 4,698,824, Cl. 373-49.000.

Wilson, James D., to Maytag Company, The. Coin actuated appliance with coin collecting apparatus. 4,697,687, Cl. 194-344.000.

Wilson, John. Length measuring apparatus. 4,698,512, Cl. 250-560.000.

Wimmer, Martin A., to Motorola, Inc. Parachute reefing/release device. 4,697,765, Cl. 244-152.000.

Windmoller & Holscher: *See*—
Rombout, Anton, 4,697,516, Cl. 101-216.000.

Wing, Harold R.: *See*—
Boothe, Lee H., 4,697,305, Cl. 16-329.000.

Winland, Virgil L.; and Matyskella, James J., to Worthington Cylinder Corporation. Device and method for restricting gas flow. 4,697,611, Cl. 137-14.000.

Wirz, Walter, to Reishauer AG. Device for grinding tooth profiles of a rotating toothed workpiece. 4,697,387, Cl. 51-88.000.

Wisdom, Richard A.: *See*—
Bailey, Richard B.; Joshi, Dilip K.; Michaels, Stephen L.; and Wisdom, Richard A., 4,698,303, Cl. 435-139.000.

Wise, Colin C.: *See*—
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Witten, Mark A.; Hotze, Robert B.; and Stephenson, Leonard E., to United States of America, Air Force. Spacecraft subsystem support structure. 4,697,767, Cl. 244-158.00R.

Wolf, Gunter: *See*—
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Wolfe, Raymond: *See*—
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Wolfes, Wilhelm: *See*—
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Wollmann, Gerhard: *See*—
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Womble, David P.: *See*—
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Wong, Pui K., to Shell Oil Company. Reactive styrene polymers. 4,698,394, Cl. 525-289.000.

Wong, Show-Chu; Deol, Harbans S.; and Harz, Debra L., to Fisher Scientific Company. Stabilizing blood cells with aromatic polyaldehyde for use in hematology controls and calibrators. 4,698,312, Cl. 436-10.000.

Wong, Sing Y.: *See*—
Tavana, Danesh; and Wong, Sing Y., 4,698,525, Cl. 307-456.000.

Wood, Kenneth M.; and Jarveaux, Frank, to Petro-Tube, Inc. Stabbing guide. 4,697,830, Cl. 285-27.000.

Woodhead, David A.: *See*—
Shyu, Wen B.; Woodhead, David A.; and Quigley, Vincent P., 4,698,389, Cl. 525-96.000.

Woodley, William; and Longmire, David. Apparatus for locating and detecting pain. 4,697,599, Cl. 128-734.000.

Woodward, Arthur B.: *See*—
Hotchkiss, Kenneth W.; and Woodward, Arthur B., 4,697,720, Cl. 220-337.000.

Workman, John. Dynamoelectric machines. 4,698,539, Cl. 310-216.000.

Worthington Cylinder Corporation: *See*—
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Wright State University: *See*—
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Wu, C. H.; and Wu, Gerald P. T. Vehicle with multiple power source. 4,697,660, Cl. 180-65.200.

Wu, Gerald P. T.: *See*—
Wu, C. H.; and Wu, Gerald P. T., 4,697,660, Cl. 180-65.200.

Wu, Peter, to Schlumberger Technology Corporation. Methods for processing sonic data. 4,698,793, Cl. 367-32.000.

Wuerthele, Adolf, to Gressel AG. Parallel vice. 4,697,801, Cl. 269-100.000.

Wurzburg, Uwe: *See*—
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Wynosky, Charles E.: *See*—
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Xebron Corporation: *See*—
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Xerox Corporation: *See*—
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Barker, Robert A.; Tsai, Chuang C.; and Knights, John C., 4,698,104, Cl. 437-141.000.
Berkes, John S., 4,698,290, Cl. 430-124.000.

Carter, Jeff C.; and Husted, Raymond R., 4,698,772, Cl. 364-900.000.
Fabian, Ellis, 4,698,196, Cl. 264-565.000.
Gottwald, Johannes F.; and Gruber, Dennis W., 4,698,567, Cl. 318-480.000.
Hauser, Oscar G., 4,697,914, Cl. 355-3.0DD.
Link, Edward P.; and Kerwawycz, John P., 4,698,123, Cl. 156-634.000.
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Yabe, Yuichiro: *See*—
Matsueda, Rei; Yabe, Yuichiro; Yamazaki, Mitsuo; Kokubu, Tatsuo; and Hiwada, Kunio, 4,698,329, Cl. 514-18.000.

Yacobucci, Paul D.; and Albano, Thomas, to Eastman Kodak Company. Crosslinked polymers with lowered resistivity and materials and methods for their preparation. 4,698,391, Cl. 525-162.000.

Yagi, Takashi; Horii, Yoshiharu; and Domoto, Yasuo, to Tokyo Electric Co., Ltd. Ribbon shifting device for a printing apparatus. 4,697,942, Cl. 400-208.000.

Yamada, Magoichi, to Daiwa Golf Co., Ltd. Iron club head. 4,697,814, Cl. 273-169.000.

Yamada, Naoki: *See*—
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Yamada, Tohru: *See*—
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Yamada, Yasuyuki: *See*—
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Yamagishi, Naomichi: *See*—
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Yamaguchi, Hiroshi, to Hitachi, Ltd. Steam introducing part structure of steam turbine. 4,697,983, Cl. 415-134.000.

Yamaguchi, Kiyoshi: *See*—
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Yamaguchi, Masahiko: *See*—
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Yamamoto, Masahiro; and Yatomi, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Automatic wire feeder for an electrical discharge machining apparatus including combined cleaning fluid and working fluid supply systems. 4,698,476, Cl. 219-69.00W.

Yamamoto, Naofumi: *See*—
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Yamamoto, Taizo: *See*—
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Yamamoto, Yoshun; Okubo, Hitoshi; Watanabe, Yutaka; Uchiyama, Eizo; and Yasunaga, Yutaka, to Nippon Steel Corporation. Roll forming apparatus. 4,697,446, Cl. 72-178.000.

Yamanishi, Nobue: *See*—
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Yamashita, Yasuhiko: *See*—
Maruoka, Kuniaki; Takahashi, Nobuyuki; Tujimura, Senkichi; Yamashita, Yasuhiko; Otsuka, Setsuo; Oohasi, Isao; and Motoyama, Takeo, 4,698,102, Cl. 148-2.000.

Yamauchi, Hiroshi: *See*—
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Yamazaki, Mitsuo: *See*—
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Yamazaki, Syuichi: *See*—
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Yamazaki, Toshiyuki: *See*—
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Yanabu, Satoru: *See*—
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Yanagi, Yoshitaka: *See*—
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Yanase, Takeyasu: *See*—
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Yang, Robert K.: *See*—
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Yang, Tai-Her. Swivel canopy. 4,697,777, Cl. 248-343.000.

Yang, Tai-Her. Pulley hoists. 4,697,790, Cl. 254-332.000.

Yang, Tai-Her. Simple automatic charging or cutoff circuit device for intermittent pulsating d.c. charging power supply. 4,698,580, Cl. 320-59.000.

Yaniv, Zvi: *See*—
den Boer, Willem; Payson, J. Scott; and Yaniv, Zvi, 4,698,627, Cl. 340-718.000.

Yasuda, Hiroki: *See*—
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Yasuda, Takeshi: *See*—
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Yasui, Toru, to Nippon Thompson, Co. Ltd. Crossed-roller retainer. 4,697,935, Cl. 384-47.000.

Yasunaga, Yutaka: *See*—
Yamamoto, Yoshun; Okubo, Hitoshi; Watanabe, Yutaka; Uchiyama, Eizo; and Yasunaga, Yutaka, 4,697,446, Cl. 72-178.000.

Yasuoka, Akimasa, to Honda Giken Kogyo K.K. Fuel injection timing control method for internal combustion engines. 4,697,568, Cl. 123-490.000.

Yasutomi, Tsuyoshi: *See*—
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Yatomi, Takeshi: *See*—
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Year Laboratories, Inc.: *See*—
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Yeda Research and Development Co., Ltd.: *See*—
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Yen, Mei-Rong: *See*—
Yu, Terry T.; and Yen, Mei-Rong, 4,698,184, Cl. 260-396.00R.

Ying, Minghaw, to Inko Industrial Corporation. Dust free storage container for a membrane assembly such as a pellicle and its method of use. 4,697,701, Cl. 206-316.000.

Yla-Hemmila, Veikko: *See*—
Aalto, Erkki; and Yla-Hemmila, Veikko, 4,697,607, Cl. 137-1.000.

Yoda, Akira: *See*—
Sato, Yoshimitsu; Ohtsuka, Shuichi; Kimura, Akinori; Yoda, Akira; Kato, Keishi; and Takahashi, Isoji, 4,697,912, Cl. 355-3.00R.

Yokoo, Hiroshi: *See*—
Inoue, Senya; Ono, Akira; Kobayashi, Mikio; and Yokoo, Hiroshi, 4,698,317, Cl. 501-9.000.

Yoshida, Akira: *See*—
Hida, Yoshinori; Meguriya, Noriyuki; and Yoshida, Akira, 4,697,877, Cl. 350-96.300.

Yoshida Kogyo K. K.: *See*—
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Yoshida, Kuniaki: *See*—
Okabe, Nobuya; Hirata, Toichi; Yoshida, Kuniaki; Sugiyama, Genroku; Haga, Masakazu; Tanaka, Hideaki; and Tatsumi, Akira, 4,697,418, Cl. 60-434.000.

Yoshida, Makoto, to Aupac Co., Ltd. dc brushless electromagnetic rotary machine. 4,698,538, Cl. 310-179.000.

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Yoshihiro, Mitsugu: *See*—
Nishimura, Kazuhisa; Yoshihiro, Mitsugu; Sakai, Masaaki; and Hataoka, Seiichi, 4,698,703, Cl. 360-73.000.

Yoshikawa, Seiji; Sato, Isao; Nakayama, Shigenori; and Amazaki, Mitsuhiro, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Direction control valve fitted with a flow control mechanism. 4,697,498, Cl. 91-420.000.

Yoshiki Industrial Co., Ltd.: *See*—
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Yoshinaga, Shoji: *See*—
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Yoshino, Akira, to Daidousanso Co., Ltd. High-purity nitrogen gas production equipment. 4,698,079, Cl. 62-11.000.

Yoshino Kogyosho Co., Ltd.: *See*—
Saito, Tadao; and Ogawa, Riichi, 4,697,722, Cl. 222-571.000.

Yoshio, Junichi, to Pioneer Electronic Corporation. Tracking servo device. 4,698,795, Cl. 369-44.000.

Yoshioka, Koichi; Tamura, Norikazu; and Natsugari, Hideaki, to Takeda Chemical Industries, Ltd. Carbapenems, their production and use. 4,698,339, Cl. 514-210.000.

Yoshizawa, Kenichi: *See*—
Hayakawa, Yoichi; Kawai, Masao; Yoshizawa, Kenichi; Harada, Yoshiharu; and Fukumura, Kagenori, 4,697,479, Cl. 74-867.000.

Yoshizawa, Yasuo; and Jinno, Masatoshi, to Yoshiki Industrial Co., Ltd. Process control apparatus. 4,698,574, Cl. 318-609.000.

Young, Archie R.: *See*—
Ho, Teh C.; Chianelli, Russell R.; Jacobson, Allan J.; and Young, Archie R., 4,698,145, Cl. 208-18.000.

Young, Donald C.; and Green, James A., II, to Union Oil Company of California. Biuret purification. 4,698,443, Cl. 564-38.000.

Young, Peter L.; and Chen, Chiu-Chao, to Gould Inc. Multichip thin film module. 4,698,662, Cl. 357-80.000.

Young, Richard K., to Phillips Petroleum Company. Tube support and flow director. 4,697,637, Cl. 165-160.000.

Youngquist, Robert C.; Brooks, Janet L.; Fesler, Kenneth A.; Cutler, Cassius C.; and Shaw, Herbert J., to Leland Stanford Junior University, The Board of Trustees of the. Coherent distributed sensor and method using short coherence length sources. 4,697,926, Cl. 356-345.000.

Youtt, Stanley A.; and Dixon, John W., to American Tank & Fabricating Co., The. Container structure for dangerous material. 4,697,618, Cl. 137-587.000.

Yu, Terry T.; and Yen, Mei-Rong, to Energy Conversion Devices, Inc. Tellurium imaging composition including improved reductant precursor and method. 4,698,184, Cl. 260-396.00R.

Yuasa, Katsunori: *See*—
Goto, Masao; Kimura, Haruo; Okada, Toshihiko; Yuasa, Katsunori; and Ito, Tetuzo, 4,697,708, Cl. 209-534.000.

Yuenian, Sun. Spring operated automatic door and window closing hinge. 4,697,302, Cl. 16-52.000.

Yung, Simon K. C., to SMC Metal Tech Co., Ltd. Contact lens cleaning apparatus. 4,697,605, Cl. 134-107.000.

Yusa, Tsunero: *See*—
Shibuya, Hisao; and Yusa, Tsunero, 4,697,321, Cl. 29-157.30R.

Yuyama, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Prime mover driven air-conditioning and hot-water supplying system. 4,697,434, Cl. 62-238.700.

Zachariasen, Janine M. Safety door unit and rotation guide and support device for door. 4,697,385, Cl. 49-141.000.

Zahn, Ulrich: *See*—
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Zakotnik, Robert M.: *See*—
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Zanno, Paul R.: *See*—
Barnett, Ronald E.; Zanno, Paul R.; and Roy, Glenn M., 4,698,231, Cl. 426-548.000.

Zeiger, Heinz; and Laukien, Gunther R., to Bruker Medizintechnik GmbH. Method for recording nuclear resonance signals. 4,698,594, Cl. 324-309.000.

Zemmrich, Dieter K.: *See*—
Cavicchi, Bruce T.; Dill, Hans G.; and Zemmrich, Dieter K., 4,698,455, Cl. 136-256.000.

Zenith Electronics Corporation: *See*—
Kadlec, Joseph; and Kociolek, Kenneth W., 4,698,681, Cl. 358-168.000.

Zentz, Mary K.: *See*—
Makaryk, Walter A.; Dudar, Thomas E.; and Zentz, Mary K., 4,698,061, Cl. 604-408.000.

Zibrida, John F., to AMAX Inc. Treatment of phosphate-containing wastewater. 4,698,163, Cl. 210-713.000.

Ziemelis, Maris J.: *See*—
Lo, Peter Y. K.; and Ziemelis, Maris J., 4,698,406, Cl. 528-12.000.

Zimmerman, Kenneth A.: *See*—
Desmond, John P.; Ford, Douglas W.; Fossey, Michael E.; Stanbro, Michael; and Zimmerman, Kenneth A., 4,698,785, Cl. 364-900.000.

Zimmerman, Robert L.; and Vanderpool, Steven H., to Texaco Inc. Catalytic method for the manufacture of N,N'-dimethylpiperazine. 4,698,428, Cl. 544-404.000.

Zimmerman, Tony J. Vehicle fraction attachment. 4,697,659, Cl. 180-15.000.

Zodrow, Rudolf; and Buchholz, Rainer, to Jagenberg Aktiengesellschaft. Apparatus for transferring articles, especially bottles. 4,697,691, Cl. 198-425.000.

Zollmeyer, Willi; and Scheurer, Friedrich, to Daimler-Benz Aktiengesellschaft. Driven axle for commercial vehicles. 4,697,662, Cl. 180-71.000.

Zollner, Christine: *See*—
Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, 4,698,825, Cl. 373-93.000.

Zollner, Dieter: *See*—
Schieber, Franz; Zollner, Dieter; Lauterbach, Inge; Koziol, Konrad; Zollner, Christine; and Taube, Thomas, 4,698,825, Cl. 373-93.000.

Zomp, John M.: *See*—
Bernard, Thomas E.; Roth, Emile M; Mohan, Edwin R.; Sherwin, Gary W.; and Zomp, John M., 4,697,598, Cl. 128-731.000.

Zulliger, Hans W.: *See*—
Niederer, Roland R.; and Zulliger, Hans W., 4,698,359, Cl. 514-396.000.

Zumbusch, Steven J., to Eaton Corporation. Hydraulic motor having integral flow control capability. 4,697,998, Cl. 418-61.00B.

Zweigart, Gerhard: *See*—
Klein, Norbert; Parisch, Jochen; and Zweigart, Gerhard, 4,697,841, Cl. 296-84.00R.

139316 Canada Inc: *See*—
McKenna, Arthur J., 4,697,815, Cl. 273-420.000.

2500 Corporation, The: *See*—
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501 Stichting Internationaal Instituut Voor Lucht: *See*—
Goudswaard, Frederik, 4,697,347, Cl. 33-1.00A.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF OCTOBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Telephone and Telegraph Company AT&T Bell Laboratories: *See*—
Shoji, Masakazu, Re. 32,515, Cl. 307-448.000.

American Telephone & Telegraph Co., AT&T Bell Labs: *See*—
Cantwell, Richard F., Jr., Re. 32,516, Cl. 370-89.000.

Cantwell, Richard F., Jr., to American Telephone & Telegraph Co., AT&T Bell Labs. Loop switching system. Re. 32,516, Cl. 370-89.000.

Eastman Kodak Company: *See*—
Steklenski, David J., Re. 32,514, Cl. 524-32.000.

International Flavors & Fragrances Inc.: *See*—
Seaber, Geoffrey B.; van Loveren, Augustinus G.; and Munteanu, Marina A., Re. 32,513, Cl. 239-6.000.

Munteanu, Marina A.: *See*—
Seaber, Geoffrey B.; van Loveren, Augustinus G.; and Munteanu, Marina A., Re. 32,513, Cl. 239-6.000.

Seaber, Geoffrey B.; van Loveren, Augustinus G.; and Munteanu, Marina A., to International Flavors & Fragrances Inc. Method for dispensing at a visibly detectable rate, continuously or discontinuously, for discrete periods of time at a steady rate, a volatile composition of matter from a container into the atmosphere as well as the container used in the method. Re. 32,513, Cl. 239-6.000.

Shoji, Masakazu, to American Telephone and Telegraph Company AT&T Bell Laboratories. Apparatus for increasing the speed of a circuit having a string of IGFETS. Re. 32,515, Cl. 307-448.000.

Steklenski, David J., to Eastman Kodak Company. Polymer compositions having a low coefficient of friction. Re. 32,514, Cl. 524-32.000.

van Loveren, Augustinus G.: *See*—
Seaber, Geoffrey B.; van Loveren, Augustinus G.; and Munteanu, Marina A., Re. 32,513, Cl. 239-6.000.

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Abbott Laboratories: *See*—
Holen, James T., 292,230, Cl. D24-22.000.

Abrams, Robert C.: *See*—
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Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 292,183, Cl. D11-164.000.
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Allison Corporation: *See*—
Seltzer, Samuel M.; and Dennison, Saul, 292,168, Cl. D8-14.000.

Anchor Hocking Corporation: *See*—
Thrush, James L., 292,158, Cl. D7-14.000.
Thrush, James L., 292,159, Cl. D7-40.000.
Thrush, James L., 292,174, Cl. D9-386.000.

Aquarius Rubber Pty. Ltd.: *See*—
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Baker, Richard W.: *See*—
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Berg, Franco, to Rittal-Werk Rudolf Loh GmbH & Co. KG. Cabinet latch or similar article. 292,171, 10-6-87, Cl. D8-331.000.

Berg, Harvey F.: *See*—
Miller, Cardell E.; and Berg, Harvey F., 292,172, Cl. D8-338.000.

Bergh, Leslie H. Fluid filtration unit for use in oil well hole drilling operations. 292,215, 10-6-87, Cl. D15-7.000.

Black & Decker, Inc.: *See*—
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Booty, Donald J., Jr.: *See*—
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Booty, Donald J., Sr.; and Booty, Donald J., Jr. Housing for modular electrical switch receptacle device or the like. 292,204, 10-6-87, Cl. D13-30.000.

Breger, Carl-Arne, to Monark AB. Bicycle ergometer body. 292,225, 10-6-87, Cl. D21-194.000.

Bulgari, Marina, to Marina B Creation S.A. Ring. 292,181, 10-6-87, Cl. D11-27.000.

Cahill, Bryan J.; and Jones, Lonny R. Vest with thermally insulated coolant inserts. 292,140, 10-6-87, Cl. D2-184.000.

Caldwell, John W. Lamp. 292,236, 10-6-87, Cl. D26-65.000.

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Delaney, John J., Sr. Tray for a hospital bed. 292,153, 10-6-87, Cl. D6-511.000.

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Dong-Chang, Lin. Clamp-on multimeter or similar article. 292,177, 10-6-87, Cl. D10-79.000.

Dooley, William D. Trailer for carrying medical imaging equipment. 292,196, 10-6-87, Cl. D12-97.000.

Eerdmans, Donald. Boat. 292,202, 10-6-87, Cl. D12-302.000.

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Forman, Hugh M.; and Yatsko, E. Thomas, to Baxter Travenol Laboratories, Inc. Protective closure for a medical container. 292,232, 10-6-87, Cl. D24-51.000.

Framalin, Leonard A. Down discharge heating and cooling unit. 292,228, 10-6-87, Cl. D23-329.000.
Fuhrman, John F., to Maxcom Electronics, Inc. Under dash transceiver. 292,208, 10-6-87, Cl. D14-68.000.
Fuhrman, John F., to Maxcom Electronics, Inc. Hand held transceiver. 292,209, 10-6-87, Cl. D14-68.000.
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McClure, David H. Key holder. 292,144, 10-6-87, Cl. D3-65.000.
Meyers, Wayne E. Cabinet for fireplace simulation burner unit. 292,152, 10-6-87, Cl. D6-450.000.
Miels, Edward T. Toilet tissue dispenser. 292,155, 10-6-87, Cl. D6-523.000.
Milad, Anis I. Combined helicopter and tank. 292,193, 10-6-87, Cl. D12-2.000.
Miller, Cardell E.; and Berg, Harvey F., to Ideal Security Hardware Corporation. Deadbolt lock for hinged doors. 292,172, 10-6-87, Cl. D8-338.000.
Mio, Kenzo: *See*—
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Moller International, Inc.: *See*—
Moller, Paul S., 292,194, Cl. D12-5.000.
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Nippon Notion Kogyo Co. Ltd.: *See*—
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Oates, Jack C. Magnetic holder for sockets. 292,170, 10-6-87, Cl. D8-71.000.
O'Brien, Maria R. Combined mop bucket and wringer. 292,238, 10-6-87, Cl. D32-53.000.
Oh, Chang H., to J & L Importers, Inc. Fry pan or similar article. 292,164, 10-6-87, Cl. D7-354.000.
Oh, Chang H., to J&L Importers, Inc. Fry pan or similar article. 292,165, 10-6-87, Cl. D7-360.000.
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Rudelick, John, to Universal-Rundle Corporation. Sink sprayer. 292,227, 10-6-87, Cl. D23-226.000.
St. Jacques, Roger. Fridge door organizer. 292,216, 10-6-87, Cl. D15-89.000.
Schalle, Werner E., to Aquarius Rubber Pty. Ltd. Pipe flashing. 292,233, 10-6-87, Cl. D25-70.000.
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Stutzer, Franz A., to Rowenta-Werke GmbH. Steam iron. 292,239, 10-6-87, Cl. D32-70.000.
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Thomas, James H. Air stream spoiler. 292,199, 10-6-87, Cl. D12-181.000.
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Wen, Lan-Hsiung. Stationery stand for containing visiting cards and memos. 292,220, 10-6-87, Cl. D19-92.000.
Wolf, Philip. Jewelry box. 292,175, 10-6-87, Cl. D9-420.000.
Worrell, William R.; and Laroche, Robert N., to All-Steel Canada Ltd. Work table or similar article. 292,154, 10-6-87, Cl. D6-484.000.
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Zapf, Otto W., to Hauserman, Inc. Seat. 292,145, 10-6-87, Cl. D6-334.000.
Zilka, Timothy A. Color chip holder. 292,219, 10-6-87, Cl. D19-59.000.
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DeVor Nurseries, Inc.: *See*—
Marciel, Stanley G., 6,031, Cl. 18.000.
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Marciel, Stanley G., to DeVor Nurseries, Inc. Rose plant named De Vine. 6,031, 10-6-87, Cl. 18.000.

Nakashima, Tosh, to DeVor Nurseries, Inc. Rose plant named De Vink. 6,032, 10-6-87, Cl. 22.000.

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van Andel, Jacob, to Van Staaveren B.V. Alstroemeria named Stalrin. 6,035, 10-6-87, Cl. 68.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 6TH DAY OF OCTOBER, 1987

Adolph, Horst D.; and Kim, Kyung E., to United States of America, Navy. Energetic polynitro formal plasticizers. H350, 10-6-87, Cl. 149-88.000.

Adolph, Horst G.: *See*—
Kim, Kyung E.; and Adolph, Horst G., H351, Cl. 528-266.000.
Koppes, William M.; and Adolph, Horst G., H352, Cl. 568-590.000.

Anderson, Robert D.; Carta, John; and Estes, John D., to United States of America, Army. Snap slit door with over pressure relief. H339, 10-6-87, Cl. 160-327.000.

Callahan, John J.: *See*—
Epstein, Joseph; Michel, Harry O.; Plapinger, Robert E.; Fleisher, Joseph H.; Callahan, John J.; and Jandorf, Bernard J., H346, Cl. 558-105.000.

Carta, John: *See*—
Anderson, Robert D.; Carta, John; and Estes, John D., H339, Cl. 160-327.000.

Davey, Charles T.: *See*—
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Elam, William T.: *See*—
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Epstein, Joseph; Michel, Harry O.; Plapinger, Robert E.; Fleisher, Joseph H.; Callahan, John J.; and Jandorf, Bernard J., to United States of America, Army. Process for making compounds possessing anticholinesterase activity. H346, 10-6-87, Cl. 558-105.000.

Estes, John D.: *See*—
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Fleisher, Joseph H.: *See*—
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Fraser, Donald M.: *See*—
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Geeter, Eugene, to United States of America, Army. Apparatus to improve accuracy of weapons through barrel flexure. H342, 10-6-87, Cl. 89-14.050.

Jandorf, Bernard J.: *See*—
Epstein, Joseph; Michel, Harry O.; Plapinger, Robert E.; Fleisher, Joseph H.; Callahan, John J.; and Jandorf, Bernard J., H346, Cl. 558-105.000.

Keown, William P.; and Rorabaugh, Donald T., to United States of America, Army. Fiber array reinforced kinetic energy penetrator and method of making same. H343, 10-6-87, Cl. 102-517.000.

Kim, Kyung E.; and Adolph, Horst G., to United States of America, Navy. 4,4,10,10-tetranitro-6,8-dioxatridecane-1,13-diol polyformal and method of preparation. H351, 10-6-87, Cl. 528-266.000.

Kim, Kyung E.: *See*—
Adolph, Horst D.; and Kim, Kyung E., H350, Cl. 149-88.000.

Koppes, William M.; and Adolph, Horst G., to United States of America, Navy. Bis(2-fluoro-2,2-dinitroethoxy) 2,2,3,3,4,4,4-heptafluorobutoxymethane and a method of preparation. H352, 10-6-87, Cl. 568-590.000.

Krevitz, Kenneth; Pytlewski, Louis L.; and Davey, Charles T., to United States of America, Army. Inert solid compositions which become chemically reactive when molten. H349, 10-6-87, Cl. 252-7.000.

Layden, George K.; and Prewo, Karl M., to United States of America, Air Force. Alumina fiber reinforced lithium aluminosilicate. H347, 10-6-87, Cl. 428-113.000.

Lipp, Louie J., to United States of America, Army. Resonant free platen for vibration testing of test specimens. H338, 10-6-87, Cl. 73-663.000.

Lovelace, Donald E.: *See*—
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MacKenzie, Wallace R.; and Fraser, Donald M., to United States of America, Air Force. Low mass diffusion bonding tools. H340, 10-6-87, Cl. 228-44.300.

Matta, Joseph E., to United States of America, Army. Delayed swell viscometer. H337, 10-6-87, Cl. 73-55.000.

Michel, Harry O.: *See*—
Epstein, Joseph; Michel, Harry O.; Plapinger, Robert E.; Fleisher, Joseph H.; Callahan, John J.; and Jandorf, Bernard J., H346, Cl. 558-105.000.

Miller, Miles C., to United States of America, Army. Non-destructive method to assess physical condition of chemical fill. H336, 10-6-87, Cl. 73-579.000.

Mongeon, Robert J., to United States of America, Army. Dual mode scanner/tracker. H341, 10-6-87, Cl. 356-152.000.

Panayappan, Ramanathan. Penetrating compound for the suppression of rusty-bolt intermodulation interference. H348, 10-6-87, Cl. 106-14.140.

Plapinger, Robert E.: *See*—
Epstein, Joseph; Michel, Harry O.; Plapinger, Robert E.; Fleisher, Joseph H.; Callahan, John J.; and Jandorf, Bernard J., H346, Cl. 558-105.000.

Prewo, Karl M.: *See*—
Layden, George K.; and Prewo, Karl M., H347, Cl. 428-113.000.

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Rubin, Stuart H., to United States of America, Army. Linear algorithm for non-linear interpolation for computer aided designs. H354, 10-6-87, Cl. 364-491.000.

Schexnayder, Michael C.: *See*—
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Skelton, Earl F.; Elam, William T.; and Webb, Alan W., to United States of America, America. Apparatus and method for stirring fluid borne particles. H355, 10-6-87, Cl. 378-80.000.

Taylor, Henry F., to United States of America, America. Extended precision in video bandwidth analog to digital converter using optical techniques. H353, 10-6-87, Cl. 340-347.0AD.

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Skelton, Earl F.; Elam, William T.; and Webb, Alan W., H355, Cl. 378-80.000.
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Williamsen, Joel E.; and Schexnayder, Michael C., to United States of America, Army. High velocity canting shaped charge warhead. H344, 10-6-87, Cl. 102-476.000.
Williamsen, Joel E.; Lovelace, Donald E.; and Schexnayder, Michael C., to United States of America, Army. Missile canting shaped charge warhead. H345, 10-6-87, Cl. 102-476.000.

CLASSIFICATION OF PATENTS

ISSUED OCTOBER 6, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

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238 4,697,407
264 4,697,408
401 4,697,409
4,697,410
4,697,411
4,697,412

CLASS 60

39.02 4,697,413
39.08 4,697,414
39.12 4,697,415
240 4,697,416
338 4,697,417
434 4,697,418
464 4,697,419
517 4,697,420
602 4,697,421
4,697,422
605 4,697,423
670 4,697,424

CLASS 62

11 4,698,079
21 4,698,080
24 4,698,081
48 4,697,425
4,697,426
119 4,697,427
124 4,697,428
203 4,697,429
209 4,697,430
225 4,697,431
233 4,697,432
235.1 4,697,433
238.7 4,697,434
304 4,697,435

CLASS 63

3 4,697,436
15.5 4,697,437

CLASS 65

1 4,698,082
2 4,698,083
3.11 4,698,084
16 4,698,085
4,698,086
172 4,698,087
174 4,698,088
290 4,698,089

CLASS 66

75.2 4,697,438
149 R 4,697,439
177 4,697,440

CLASS 70

16 4,697,441
97 4,697,442
121 4,697,443
232 4,697,444

CLASS 71

24 4,698,090
87 4,698,091
92 4,698,092
94 4,698,093
108 4,698,094

CLASS 72

68 4,697,445
178 4,697,446
283 4,697,447
405 4,697,448
4,697,449

CLASS 73

23 4,697,450
49.3 4,697,452
64.4 4,697,451
290 R 4,697,453
440 4,697,454
497 4,697,455
592 4,697,456
820 4,697,457
862 4,697,458
862.36 4,697,459
4,697,460
862.53 4,697,461
863.21 4,697,462
866 4,697,463
866.3 4,697,464
866.5 4,697,465

CLASS 74

27 4,697,466
89.2 4,697,467
105 4,697,468
117 4,697,469
359 4,697,471
479 4,697,472
519 4,697,473
701 4,697,470
733 4,697,474
785 4,697,476
793 4,697,477
859 4,697,478
866 4,697,475
867 4,697,479

CLASS 75

58 4,698,095
248 4,698,096

CLASS 81

3.09 4,697,480
22 4,697,481
64 4,697,482
418 4,697,483

CLASS 82

1.5 4,697,484

CLASS 83

34 4,697,485
79 4,697,486
437 4,697,488
708 4,697,487
856 4,697,489

CLASS 84

1.01 4,697,490
1.05 4,697,491
1.16 4,697,492
313 4,697,493
458 4,697,494

CLASS 89

33.03 4,697,496
143 4,697,495

CLASS 91

372 4,697,497
420 4,697,498

CLASS 92

151 4,697,499

CLASS 98

67 4,697,500

CLASS 99

279 4,697,501
299 4,697,502
306 4,697,503
331 4,697,504
450.1 4,697,505
482 4,697,506
483 4,697,507
517 4,697,508

CLASS 100

14 4,697,510
37 4,697,511
233 4,697,509

CLASS 101

111 4,697,513
142 4,697,512
170 4,697,514
179 4,697,515
216 4,697,516
348 4,697,517

CLASS 102

334 4,697,520
4,697,521
358 4,697,518
402 4,697,522
406 4,697,519
440 4,697,523
498 4,697,524
518 4,697,525

CLASS 105

3 4,697,526
133 4,697,527
358 4,697,528

CLASS 106

15.05 4,698,097
18.36 4,698,098
288 R 4,698,099
304 4,698,100

CLASS 108

511 4,697,529

CLASS 110

234 4,697,530
336 4,697,531
346 4,697,532

CLASS 114

44 4,697,533
90 4,697,534
183 R 4,697,535
222 4,697,536
230 4,697,537
4,697,538
266 4,697,539
354 4,697,540

CLASS 116

28 R 4,697,541

CLASS 118

63 4,697,542
412 4,697,543
504 4,697,544
624 4,697,545

CLASS 119

3 4,697,546
18 4,697,547
22 4,697,548
156 4,697,549

CLASS 122

34 4,697,550

CLASS 123

41.31 4,697,551
56 BC 4,697,552
73 AD 4,697,553
90.22 4,697,554
90.23 4,697,555
195 HC 4,697,556
319 4,697,557
321 4,697,558
325 4,697,559
335 4,697,560
339 4,697,561
4,697,562
421 4,697,563
440 4,697,564
449 4,697,565
479 4,697,566
489 4,697,567
490 4,697,568
568 4,697,569
602 4,697,570

CLASS 124

25 4,697,571

CLASS 126

343.5 R 4,697,572

CLASS 127

30 4,698,101

CLASS 128

1 D 4,697,573
4,697,574
1.2 4,697,575
4 4,697,576
6 4,697,577
16 4,697,578
24 A 4,697,579
36 4,697,580
41 4,697,581
69 4,697,582
80 C 4,697,583
92 V 4,697,586
92 VQ 4,697,584
92 YZ 4,697,585
203.11 4,697,587
328 4,697,588
359 4,697,589
396 4,697,590
419 PG 4,697,591
634 4,697,593
653 4,697,594
660 4,697,595
681 4,697,596
699 4,697,597
731 4,697,598
734 4,697,599
753 4,697,600
777 4,697,601

CLASS 131

51 4,697,602
84.4 4,697,603
296 4,697,604

CLASS 134

107 4,697,605

CLASS 135

20 M 4,697,606

CLASS 136

233 4,698,454
256 4,698,455

CLASS 137

1 4,697,607
4,697,608
4,697,609
3 4,697,610
14 4,697,611
39 4,697,612
171 4,697,613
337 4,697,614
340 4,697,615
486 4,697,616
549 4,697,617
587 4,697,618
613 4,697,619
625.17 4,697,620

CLASS 141

1 4,697,621
4,697,622
80 4,697,623
208 4,697,624

CLASS 144

2 N 4,697,625
373 4,697,626

CLASS 148

2 4,698,102
12 F 4,698,103

CLASS 149

2 4,698,105
7 4,698,106
4,698,107
21 4,698,108

CLASS 152

209 R 4,697,627
213 R 4,697,628

CLASS 156

145 4,698,109
231 4,698,110
244.11 4,698,111
250 4,698,112
275.7 4,698,113
353 4,698,114
382 4,698,115
423 4,698,116
486 4,698,117
499 4,698,118
506 4,698,119
608 4,698,120
622 4,698,121
625 4,698,122
634 4,698,123
642 4,698,124
643 4,698,125
4,698,126
4,698,127
4,698,128
4,698,129
646 4,698,130
647 4,698,131
657 4,698,132

CLASS 160

177 4,697,629
4,697,630

CLASS 162

5 4,698,133
199 4,698,134

CLASS 164

46 4,697,631
369 4,697,632

CLASS 165

51 4,697,633
76 4,697,634
147 4,697,635
156 4,697,636
160 4,697,637

CLASS 166

65.1 4,697,638
82 4,697,639
120 4,697,640
243 4,697,641
263 4,697,642

CLASS 169

23 4,697,643

CLASS 172

123 4,697,644
510 4,697,645
730 4,697,646

CLASS 173

91 4,697,647
162 R 4,697,648

CLASS 174

11 R 4,698,456
36 4,698,457
73 R 4,698,458
138 F 4,698,459

CLASS 175

19 4,697,649
50 4,697,650
61 4,697,651
325 4,697,652
329 4,697,653
4,697,654

CLASS 177

127 4,697,655
144 4,697,656
210 FP 4,697,657
229 4,697,658

CLASS 178

19 4,698,460
4,698,461

CLASS 180

6.5 4,697,661
15 4,697,659
65.2 4,697,660
71 4,697,662
210 4,697,663
226 4,697,664
230 4,697,665
272 4,697,666

CLASS 181

113 4,697,667
262 4,697,668

CLASS 182

92 4,697,669

CLASS 184

1.5 4,697,670

CLASS 188

72.9 4,697,671
134 4,697,672
291 4,697,673
298 4,697,674

CLASS 191

59.1 4,698,462

CLASS 192

7 4,697,675
8 R 4,697,676
48.91 4,697,677
70.18 4,697,679
70.28 4,697,678
86 4,697,680
98 4,697,681
106.2 4,697,682
107 C 4,697,683
107 R 4,697,684
109 R 4,697,685

CLASS 193

23 4,697,686

CLASS 194

344 4,697,687

CLASS 198

339.1 4,697,688
394 4,697,689
395 4,697,690
425 4,697,691
464.3 4,697,692
699 4,697,693
782 4,697,694
803.15 4,697,695
822 4,697,696

CLASS 200

5 R 4,698,463
4,698,464
16 F 4,698,465
61.78 4,698,466
144 B 4,698,467
148 B 4,698,468
148 E 4,698,469
288 4,698,470
302.2 4,698,471

CLASS 202

234 4,698,135

CLASS 203

11 4,698,136
51 4,698,137
91 4,698,138

CLASS 204

112 4,698,139
146 4,698,140
181.7 4,698,141
182.3 4,698,142
253 4,698,143
257 4,698,144

CLASS 206

5.1 4,697,697
39.4 4,697,698
44.11 4,697,699
83 4,697,700
316 4,697,701
387 4,697,702
438 4,697,703
444 4,697,704
488 4,697,705
573 4,697,706
585 4,697,707

CLASS 208

18 4,698,145
86 4,698,146
107 4,698,147
390 4,698,148
428 4,698,149

CLASS 209

421 4,698,150
534 4,697,708
549 4,697,709

CLASS 210

96.1 4,698,151
4,698,152
192 4,698,153
232 4,698,154
321.6 4,698,155
331 4,698,156
496 4,698,157
610 4,698,158
634 4,698,159
647 4,698,160
701 4,698,161
710 4,698,162
713 4,698,163
739 4,698,164
755 4,698,165
774 4,698,166

CLASS 211

45 4,697,710
182 4,697,711
187 4,697,712
189 4,697,713

CLASS 215

252 4,697,714
330 4,697,715
352 4,697,716
354 4,697,717

CLASS 219

10.55 E 4,698,472
10.79 4,698,473
60 A 4,698,474
69 R 4,698,477
69 W 4,698,475
4,698,476
4,698,478
121 LG 4,698,480
121 LU 4,698,483
121 LV 4,698,479
4,698,482
121 PY 4,698,481
130.01 4,698,484
228 4,698,485
506 4,698,487
549 4,698,488

CLASS 220

82 R 4,697,718
258 4,697,719
337 4,697,720

CLASS 221

211 4,697,721

CLASS 222

571 4,697,722
600 4,697,723

CLASS 223

78 4,697,724

CLASS 224

41 4,697,725

CLASS 225

100 4,697,726

CLASS 226

74 4,697,727
196 4,697,728

CLASS 228

20 4,697,729
37 4,697,730

CLASS 229

23 R 4,697,731
87 F 4,697,732

CLASS 232

34 4,697,733

CLASS 235

407 4,698,489
472 4,698,490

CLASS 236

13 4,697,734
44 C 4,697,735
49 4,697,736

CLASS 239

6 Re.32,513
67 4,697,737
102.2 4,697,738
127 4,697,739
271 4,697,740
391 4,697,741
587 4,697,742

CLASS 241

5 4,697,743
20 4,697,744
30 4,697,745
46 B 4,697,746
54 4,697,747
62 4,697,748
169 4,697,749
247 4,697,750
301 4,697,751

CLASS 242

7.11 4,697,752
18.1 4,697,753
55.3 4,697,754
56.4 4,697,755
67.1 R 4,697,756
68.5 4,697,757
84.1 M 4,697,758
179 4,697,759
220 4,697,760

CLASS 244

62 4,697,761
101 4,697,762
129.4 4,697,763
137.4 4,697,764
152 4,697,765
155 R 4,697,766
158 R 4,697,767
191 4,697,768
199 4,697,769

CLASS 248

62 4,697,770
97 4,697,771
162.1 4,697,773
183 4,697,772
221.4 4,697,774
231.4 4,697,775
311.2 4,697,776
343 4,697,777
349 4,697,778
530 4,697,779
558 4,697,780
559 4,697,781
639 4,697,782
900 4,697,783

CLASS 249

119 4,697,784

CLASS 250

201 4,698,491
4,698,492
204 4,698,493
211 R 4,698,494
4,698,495
213 VT 4,698,496
231 R 4,698,497
234 4,698,498
256 4,698,499
4,698,500
265 4,698,501
306 4,698,502
311 4,698,503
319 4,698,504
337 4,698,505
363 S 4,698,506
429 4,698,507
484.1 4,698,508
492.2 4,698,486
4,698,509
506.1 4,698,510
560 4,698,511
4,698,512
561 4,698,513
566 4,698,514
578 4,698,515

CLASS 251

9 4,697,785
309 4,697,786
315 4,697,787

CLASS 252

8.553 4,698,168
8.8 4,698,167
33.2 4,698,170
49.6 4,698,169
60 4,698,171
62.59 4,698,182
70 4,698,172
4,698,173
174.24 4,698,174
182 4,698,175
299.61 4,698,176
299.63 4,698,177
309 4,698,178
511 4,698,179
522 R 4,698,180
527 4,698,181
700 4,698,183

CLASS 254

8 B 4,697,788
104 4,697,789
332 4,697,790

CLASS 260

396 R 4,698,184
403 4,698,185
421 4,698,186
546 4,698,187

CLASS 261

107 4,698,188

CLASS 264

22 4,698,189
40.2 4,698,190
50 4,698,191
101 4,698,192
171 4,698,193
185 4,698,194
235.8 4,698,195
565 4,698,196

CLASS 266

48 4,697,791
248 4,697,792

CLASS 267

35 4,697,796
64.24 4,697,797
70 4,697,798
186 4,697,795
195 4,697,793
4,697,794

CLASS 269

32 4,697,799
4,697,800
100 4,697,801
323 4,697,802

CLASS 270

47 4,697,805

CLASS 271

127 4,697,803
162 4,697,804
288 4,697,806

CLASS 272

27 N 4,697,807
70 4,697,808
118 4,697,809

CLASS 273

1.5 A 4,697,810
73 C 4,697,811
86 B 4,697,812
167 H 4,697,813
169 4,697,814
420 4,697,815

CLASS 280

6 H 4,697,822
91 4,697,816
94 4,697,817
415 A 4,697,818
491 E 4,697,819
609 4,697,820
4,697,821
644 4,697,823
701 4,697,824
703 4,697,825
804 4,697,826
808 4,697,827

CLASS 285

18 4,697,828
4,697,829
27 4,697,830
174 4,697,831
319 4,697,832

CLASS 290

54 4,698,516

CLASS 292

318 4,697,833

CLASS 294

55 4,697,834
4,697,835
68.2 4,697,836
88 4,697,837
4,697,838
115 4,697,839
119.4 4,697,840

CLASS 296

78.1 4,697,842
84 R 4,697,841
97 G 4,697,843
203 4,697,844

CLASS 297

118 4,697,845
298 4,697,846
440 4,697,847
460 4,697,848
485 4,697,849

CLASS 299

87 4,697,850

CLASS 300

1 4,697,851

CLASS 303

7 4,697,852
4,697,853

CLASS 307

43 4,698,517
106 4,698,518
254 4,698,519
270 4,698,521
309 4,698,522
351 4,698,523
448 Re.32,515
450 4,698,524
456 4,698,525
475 4,698,526
4,698,527
517 4,698,528
542 4,698,529
571 4,698,530
592 4,698,531
633 4,698,520

CLASS 310

12 4,698,532
67 R 4,698,542
71 4,698,533
89 4,698,534
156 4,698,535
168 4,698,536
4,698,537
179 4,698,538
216 4,698,539
239 4,698,540
326 4,698,541

CLASS 312

223 4,697,854
290 4,697,855
305 4,697,856
306 4,697,857

CLASS 313

357 4,698,543
379 4,698,544
402 4,698,545
446 4,698,546
485 4,698,547
487 4,698,548
490 4,698,549
618 4,698,550
619 4,698,551

CLASS 315

82 4,698,552
200 R 4,698,553
307 4,698,554
366 4,698,555
371 4,698,556
383 4,698,557
4,698,558
408 4,698,559

CLASS 318

54 4,698,560
87 4,698,561
254 4,698,562
4,698,563
257 4,698,564
318 4,698,565
332 4,698,566
480 4,698,567
481 4,698,568
567 4,698,569
568 4,698,570
4,698,571
4,698,572
571 4,698,573
609 4,698,574
640 4,698,575
687 4,698,576
805 4,698,577

CLASS 320

13 4,698,578
14 4,698,579
59 4,698,580

CLASS 323

211 4,698,581
285 4,698,582

CLASS 324

62 4,698,584
66 4,698,585
71.1 4,698,586
73 R 4,698,587
4,698,588
158 R 4,698,589
160 4,698,590
307 4,698,591
309 4,698,592
4,698,593
4,698,594
313 4,698,595
546 4,698,583

CLASS 328

127 4,698,596
163 4,698,597

CLASS 329

134 4,698,598

CLASS 330

252 4,698,599

CLASS 331

1 A 4,698,600
4,698,601

CLASS 332

7.51 4,698,602
31 R 4,698,603

CLASS 333

24.2 4,698,604
184 4,698,605

CLASS 335

45 4,698,606
195 4,698,607
222 4,698,608
255 4,698,609
281 4,698,610
298 4,698,611

CLASS 337

320 4,698,612

CLASS 338

22 R 4,698,614
176 4,698,613

CLASS 340

63 4,698,615
347 P 4,698,616
365 R 4,698,618
384 E 4,698,619
568 4,698,620
639 4,698,621
648 4,698,622
665 4,698,623
709 4,698,624
4,698,625
710 4,698,626
718 4,698,627
825.02 4,698,628
825.05 4,698,629
825.31 4,698,630

853 4,698,631

CLASS 342

17 4,698,632
22 4,698,634
42 4,698,633
64 4,698,635
104 4,698,636
399 4,698,637

CLASS 343

725 4,698,638
756 4,698,639
882 4,698,640
4,698,641

CLASS 346

75 4,698,642
76 PH 4,698,643
4,698,646
108 4,698,647
4,698,648
4,698,649
134 4,698,650
140 R 4,698,644
4,698,645

CLASS 350

1.4 4,697,866
96.10 4,697,867
96.12 4,697,868
96.15 4,697,869
96.20 4,697,870
96.21 4,697,871
4,697,872
96.23 4,697,873
4,697,874
4,697,875
96.29 4,697,876
96.30 4,697,877
162.11 4,697,878
174 4,697,879
247 4,697,880
276 R 4,697,881
287 4,697,882
331 R 4,697,883
334 4,697,884
4,697,885
336 4,697,886
350 S 4,697,887
358 4,697,888
392 4,697,889
407 4,697,890
429 4,697,891
432 4,697,892
516 4,697,893
574 4,697,894

CLASS 351

243 4,697,895

CLASS 352

180 4,697,896

CLASS 354

64 4,697,897
127.13 4,697,898
173.11 4,697,899
215 4,697,900
221 4,697,901
281 4,697,902
288 4,697,903
403 4,697,904
406 4,697,905
416 4,697,906
4,697,907
439 4,697,908
484 4,697,909

CLASS 355

3 DD 4,697,914
3 R 4,697,910
4,697,912
4,697,913
3 SH 4,697,911
14 CH 4,697,920
14 D 4,697,915
14 E 4,697,916
14 R 4,697,917
27 4,697,918
4,697,919

CLASS 356

15 4,697,921
28.5 4,697,922
239 4,697,923
333 4,697,924
339 4,697,925
345 4,697,926
360 4,697,927

CLASS 357

16 4,698,652
22 4,698,653
4,698,654
23.4 4,698,655
24 4,698,656
25 4,698,657
30 4,698,658
42 4,698,659
70 4,698,660
74 4,698,661
80 4,698,662
81 4,698,663

CLASS 358

10 4,698,664
12 4,698,665
22 4,698,666
35 4,698,667
76 4,698,669
86 4,698,670
92 4,698,668
111 4,698,671
136 4,698,672
140 4,698,673
4,698,674
4,698,675
4,698,676
147 4,698,677
148 4,698,678
153 4,698,679
166 4,698,680
168 4,698,681
182 4,698,682
213.15 4,698,685
213.18 4,698,686
214 4,698,683
230 4,698,687
237 4,698,684
257 4,698,688
260 4,698,689
283 4,698,690
4,698,691
299 4,698,692
310 4,698,693
326 4,698,694
338 4,698,695
340 4,698,696
4,698,697

CLASS 360

10.1 4,698,698
10.2 4,698,699
16 4,698,700
4,698,701
33.1 4,698,702
73 4,698,703
74.1 4,698,704
92 4,698,705
96.4 4,698,706
99 4,698,707
103 4,698,708
104 4,698,709
106 4,698,710
113 4,698,711
128 4,698,712
132 4,698,713
133 4,698,714
4,698,715
135 4,698,716

CLASS 361

1 4,698,717
77 4,698,718
87 4,698,719
91 4,698,720
110 4,698,721
111 4,698,722
218 4,698,723
220 4,698,724
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DESIGN PATENTS

01	292,218	13	292,196		292,191		292,195	36	292,147		292,219
04	292,157	17	292,141		292,204		292,201		292,151	40	292,160
06	292,140		292,152		292,221		292,202		292,153		292,231
	292,155		292,182		292,230		292,228		292,179	42	292,178
	292,161		292,183		292,235	27	292,154	37	292,146		292,238
	292,163		292,184	18	292,173		292,229		292,169	45	292,170
	292,194		292,185		292,226	29	292,142	39	292,143	53	292,214
	292,199		292,166	22	292,180		292,208		292,144	55	292,172
	292,217		292,187	24	292,166		292,209		292,158		292,227
	292,223		292,188		292,193	33	292,176		292,159		292,232
	292,224		292,189	25	292,148	34	292,168		292,174	56	292,215
	292,236		292,190	26	292,156		292,222				

PLANT PATENTS

06	6,031		6,032				

STATUTORY INVENTION REGISTRATIONS

01	H344		H347		H337		H348		H352	42	H349
	H345	11	H355								
06	H340	12	H339		H338		H350	34	H342		H354
09	H341	24	H336		H346		H351		H343	51	H353

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